

# AMERICAN VETERINARY REVIEW,

OCTOBER, 1892.

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## EDITORIAL.

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UNITED STATES VETERINARY MEDICAL ASSOCIATION.—

The twenty-ninth annual meeting of the United States Veterinary Medical Association is just over, and its members may justly feel proud of the results which have been accomplished. We are sure that those who were so fortunate as to be present will never forget the profit and pleasure attending the sociable and friendly gathering of 1892 in Boston.

It is not our intention at present to present a resume of the entire transactions of the three days during which the meeting continued in session. Peculiar circumstances compelling us to postpone this, aside from the fact that they are to be published by the Association. We, however, desire to call the attention of our friends to some points of importance which should not be overlooked, and need not be deferred. Among these we first refer to the increase of membership by the admission of 101 out of a list of 106 candidates, the largest accession ever known in the history of the Association, and bringing its roll of membership to over 350 associates.

*Secondly.*—The adoption of the amendment presented last year, which reads as follows:

“ARTICLE I. Any applicant for membership shall submit his name upon one of the Association's application blanks, duly vouched for by one or more members of the Association, or by the resident State Secretary of his respective State. He shall be a graduate of a regularly organized and recognized veterinary school, which shall have a curriculum of at least three years, of six months each, specially devoted to the study of veterinary science, and whose corps of

instructors shall contain at least four veterinarians. If of a medical school a similar curriculum as to time shall prevail."

This alteration to go into effect after the annual meeting of 1892. It shall not be retroactive, nor apply to applicants who were college matriculants prior to its passage.

This was unanimously passed, with the understanding that it was not the spirit of the amendment to exclude matriculants of colleges for the session of 1892-1893. Whatever may be the effect of the adoption of this amendment upon the various questions which may arise under its operation, must be determined by the experience of the future.

*Thirdly.*—The presentation of their report by Committee of Arrangements for the International Meeting, and its almost unanimous adoption by the Association, only a single section receiving a slight amendment. The general plan of the committee is indicated in the following resolutions:

1st. That the next meeting of the Association shall be known as "The Thirtieth Anniversary Meeting of the United States Veterinary Medical Association and First International Veterinary Congress of America," and that it shall last four days.

2d. That a circular letter of invitation be addressed to the membership of the profession in the United States, and also to European veterinarians, asking their co-operation in the congress.

3d. That a special invitation be addressed to one of the officers of each of the national veterinary representative bodies of Europe.

4th. That besides the usual reading of papers, some important subjects of international interest relating to veterinary science be selected, and that committees be appointed to make reports on the same, for the purpose of their discussion by the Congress.

5th. That a special assessment be made upon each member to defray the extra expenses of the meeting.

*Fourth.*—The election of officers resulted in the selection of Dr. W. L. Williams, V.S., of Lafayette, Ind.; A. W. Clement, V.S., of Baltimore, Md.; W. H. Hoskins, D.V.S., of Philadelphia, Pa., and J. L. Robertson, M.D., D.V.S., New York.

By a suspension of the rules, the old board of officers were authorized to conduct the business of the meeting until the time of adjournment, when the new board should enter upon the performance of their official duties.

This change in one of the old customs of the Association became necessary in consequence of the amount and the importance of the work undertaken and accomplished by the meeting.

While these might be considered subjects of exceptional interest at this meeting, it must not be supposed that we intend to consider as of secondary importance the courteous and friendly hospitality offered by the Massachusetts State Veterinary Medical Association, including an excursion in Boston harbor, its dinner, and its theatrical party. Nor do we desire to ignore the graver incidents of the last day, when the Association was treated by Drs. Salmon, Winchester, Williams, Kilbourne, Gadsden and Johnson to a series of most valuable and interesting papers. Neither have we forgotten the splendors of the banquet at Young's—but as we have said—time presses upon us, and desirous always to be faithful to our engagements, we must for the present suspend our remarks, to be resumed at a future day.

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## ORIGINAL ARTICLES.

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### STRONGYLUS ARMATUS.

By T. F. WINCHESTER, D.V.S., Lawrence, Mass.

(A paper read before the United States Veterinary Medical Association).

In presenting this subject to you, I do not want to convey the idea that it is a new subject, or of recent origin. I simply desire that it may renew its youth, and to establish the fact that this condition does exist in localities other than on the continent. Judging from the literature in English on this subject, it has certainly been overlooked, for, with a few exceptions, only cases are reported that are interesting on account of their grossness.

Owing to these facts, it has been necessary for me to obtain the greater part of the literature from continental authors. Finding that to be the case, I have had the able assistance of Dr. J. M. Parker, of Haverhill, in order that a part of the investigation may be original work. To him we are indebted for several original drawings, the enlarged plates from Neumann, mounted specimens, revised description of the parasite, besides several post-mortem reports of horses that had lesions due to this nematode.

At this point it might be well to state that in man, according to Prof. W. F. Whitney, of Harvard Medical School, aneurisms have never been found due to a nematode.

#### STRONGYLUS ARMATUS.

*Synonyms*.—Armed Sclerostome; Sclerostoma equinum; Palissade worm; armed Strongyle.

This parasite is a nematoid of the genera strongylus. The term "nematode" derives its origin from the Greek word "nema," signifying "a thread"; the term strongylus meaning round or cylindrical.

#### HISTORY.

A knowledge of these parasites goes back to the seventeenth century. In 1655, Ruysch discovered in an aneurism of the mesenteric artery of a horse an innumerable quantity of small worms, and later he published three or four similar observations. Schultze, in 1725, Chabert, in 1782, recorded similar instances, and since then such observations have been greatly multiplied, principally by Rudolphi, Hodgson, Greve, Rigot and many others, including English and American veterinarians. Bollinger has made an attentive study of this parasitism, and in following it out has definitely established its essential points. These verminous aneurisms have only been found in the equidæ, and, according to Neumann, more frequent in the ass than in the horse.

Hering asserted that, except in young foals, it is rare to find a horse without aneurismal dilation, and Bollinger estimated that from ninety to ninety-four per cent. of adult



horses were so affected. They are found principally in the large mesenteric artery and its branches, although it is found in other arteries.

#### DESCRIPTION OF PARASITE.

*Armed Sclerostome*.—Body gray or brown, shaded with red; straight, rigid, the anterior part being broader than that which immediately follows (see Plate 1). Mouth orbicular, widely open, and rendered tense by several chitinous, concentric rings, the innermost of which are garnished with fine teeth, while the outermost carry six papillæ symmetrically divided. On the outermost ring there is, also, a fringe of what appeared like long, slender, sharp-pointed cilia; these are not seen when the mouth is closed; they are best shown by pressing on the cover glass, and so pressing the air out of the mouth, causing the cilia to spread outward. The six papillæ mentioned by Neumann are sharp spicules, and are curved inward, hook-like, and probably serve the purpose of attaching the worm to the mucous membrane. The buccal capsule is sustained by a dorsal longitudinal line or rib, and has at the bottom two round, sharp plates. Opening out of the mouth is the pharyngeal capsule, which is armed anteriorly, and is funnel shaped, the posterior opening being the smaller. The anterior portion of the œsophagus is constricted and narrow for about a third of its length, when it begins to expand, forming the posterior ventricle or bulb.

The caudal pouch of the male is almost trilobate, the posterior ribs being trifurcated, the middle double, and the anterior cleft. From the anterior portion of the pouch, the spicula or male genital organ projects. It is first divided into two equal parts—deferens canals—which afterward unite toward the extremity.

The female, which is much thicker and larger than the male, has the tail obtuse, and the vulva situated in the posterior moiety of the body; and is surrounded by a roughened circular surface of a reddish brown color, which is grasped by the caudal pouch of the male during copulation. The uterus occupies a large part of the body; it can be made out

very readily by the ova, which are usually present in large numbers.

The eggs are ovoid, and measure  $92\mu$  and  $54\mu$  broad. The dimensions are variable; sometimes the males are 18 mm. to 20 mm. long, and the females 20 mm. to 26 mm., and at other times it is respectively 26 mm. to 35 mm. and 35 mm. to 55 mm.

The worms are found in an agamous or undeveloped state in blood vessels (Plate II.). In this condition they are covered by a thin, transparent membrane, which entirely covers and closes the still undeveloped worm. It has a temporary mouth and œsophagus, which lead directly into the still imperfectly formed mouth. This worm infests the cæcum and commencement of the large colon, and, with the *ascaris megacephala*, is the worm most commonly found in the equidæ.

The armed sclerostome holds firmly by the buccal armature to the mucous membrane, which forms at the point of adherence a small, dark prominence. They are frequently met with in couples, the two individuals forming an almost right angle, and adhering so intimately that they may be preserved in this condition in alcohol. Notwithstanding their sometimes considerable numbers, and the irritation they should produce in the mucous membrane, their presence in the horse is rarely betrayed by any appreciable symptom. They have sometimes been accused of causing death by anæmia, diarrhœa, colic, etc.

It is not only on the internal surface of the large intestines that they are met with, for they are found in aneurisms of the mesenteric artery, and in the hepatic, renal, spermatic, occipital and other arteries; in the muscles, pancreas (Goubaux, Montane) ligaments of the liver, and in submucous cysts of the cæcum, and sometimes of the duodenum. In all these instances they are in an agamous state, and represent one of the phases in the development of the species.

With regard to the intestinal tumors, their volume varies from that of the head of a pin to that of a hazel or small almond-nut, according to the development attained by the

worm inside each tumor. The latter also contains altered blood or pus, and there is more or less hyperæmia around the circumference. The worm within is rolled upon itself, and is, of course, of variable dimensions, sometimes extremely fine, and never so large as in the adult state; it is always destitute of reproductive organs.

Occasionally there is no worm in the tumor, and then there is seen a small opening at the summit, by which it has escaped. The worms found in the organs mentioned above are also agamous; they represent the primary phase of development, as they do not become sexualized except in the cæcum and colon.

Colin states that the armed sclerostomes are worms which migrate internally, and that their development is effected almost in one place. The ova are deposited in the substance of the intestinal mucous membrane—perhaps in the punctures produced by the mouth of the female, or perhaps merely in the orifices of the glands—and they are hatched there, the embryos becoming encysted at the points where they are hatched, in the cyst developed by their presence.

After being developed and having undergone several moultings, they make their exit from the cyst, and fix themselves on the surface of the mucous membrane; though a certain number remain in their cyst, grow there, have the genital organs partly formed, but nevertheless always remain agamous. Those found in aneurisms and in the peri-intestinal organs, must have entered the blood vessels on their leaving the cyst, and in this way be carried—by a centrifugal migration—to the parts where they are found.

Railliet has shown that this is not the ordinary mode of reproduction and development of the sclerostomes. The ova are expelled along with the fæces, and become hatched in a few days if they are in a damp place. The embryos that issue from them are cylindroid, a third or a fourth of a millimetre long, somewhat obtuse in front, and have a filiform tail. If the conditions of humidity continue to be favorable, they gradually grow, their integument becomes folded and forms a kind of sheath in which the worm moults in an evident

manner. Railliet has been able to keep them several months in this state, or after complete moulting. It is at this period that they enter the body of the horse, in the water the animal drinks (or perhaps on green forage), undergo moulting if they have not already done so, and penetrate the substance of the mucous membrane. Leuckart asserts that the embryos should pass through an intermediate host before entering the intestine of the horse. But however this may be, it is possible that after they have lodged themselves in the mucous membrane, a small number of embryos stay to fix themselves in the cysts which they cause to be formed. The majority reach the circulatory system, and install themselves in the abdominal arteries—principally at the origin of the great mesenteric; there they form aneurismal dilations, filled with a ragged clot that adheres to the inner surface of the vessel, and in this helminths are located.

After an indefinite sojourn in the aneurism, the worms leave it by allowing themselves to be carried by the blood, and in the course of time reach the cæcum, where they form the majority, if not the whole, of the submucous cysts. Their last migration is, therefore, in reality, centripetal.

Finally, after remaining a more or less considerable time in the tumor they had caused the formation of, and having grown, the sclerostomes forsake it, attach themselves to the mucous membrane, become sexualized, and copulate.

An interesting observation of Railliet gives support to this theory as to the development of the sclerostomes. He found in a horse a considerable quantity of these worms in the cæcum, verminous cysts in the walls of that viscus, and a smaller number in the duodenum and other parts of the small intestine.

The cysts in the duodenum—which are rare—were grouped on the small curvature of the intestine, and some were even observed disseminated in the mesentery. All of the latter contained sclerostomes still agamous; but several of those in the small intestines, like those of the cæcum, had an opening in their center and were vacant, the helminths having left them. This would seem to prove that the worms had reached the intestines by way of the arteries.

These verminous aneurisms have only been seen in the equidæ—horse, ass, mule and hemione.

According to Semmer, at Dorpat all the foals, without exception, have verminous aneurisms. Mather has witnessed a kind of epizooty break out among foals, consisting of verminous aneurisms of the aorta, near the origin of the renal arteries.

These aneurisms are seen only on certain visceral branches of the posterior aorta, and exceptionally on the posterior aorta itself. In sixty-five horses, Hering has noted aneurism of the trunk of the great mesenteric artery in seven cases; the cœliac artery in fifty-nine cases; the cæcal artery in eighteen cases; the artery of the small intestine in sixteen cases; the small mesenteric artery in two cases; the cœliac trunk in two cases; the hepatic artery in three cases; and in the renal artery in one case. It is not uncommon to find more than one aneurism in the same horse.

In thirty-five horses, Bollinger counted sixty aneurisms; and in adding these to one hundred and eight seen by Hering in sixty-five horses, he reckoned that in one hundred horses there were one hundred and sixty-eight aneurisms, of which one hundred and fifty-three were in the large mesenteric artery and its branches, four in the cœliac trunk, three in the hepatic artery, three in the small mesenteric artery, three in the renal arteries, and two in the posterior aorta. In one hundred horses, ninety to ninety-four had one or more verminous aneurisms. Sclerostomes were also several times found in the spermatic artery, and on three occasions in the cerebral arteries. Lastly, Roll indicates them as being found in the vena cava, and, according to Valentine, a specimen was discovered in the vena portæ, at the Berne Veterinary school.

The young form of the armed sclerostome—the aneurismal sclerostome—is found in various arteries in the horse, and those of the brain are not exempt. Three observations have been published.

Albrecht reports the case of a horse which, during work, suddenly began to stagger; the eyes were fixed, and the res-



piration was noisy ; there were remissions and relapses. Three hours after the first symptoms appeared, the head was carried low and inclined to the left, and there were convulsive movements of the neck and limbs. Soon it fell on the left side, became unconscious, and manifested complete insensibility. In this state it was killed, and at the autopsy there were found diffuse meningitis, hemorrhagic encephalitis, and in the middle lobe of the cerebellum a sclerostome, which had probably arrived there when an embryo. Van Heill saw a three-year-old horse which was suddenly attacked with furious vertigo, that lasted about a quarter of an hour. An autopsy revealed congestion of the brain and choroid plexus, while a free sclerostome was lodged in the cortical substance of the right hemisphere. Le Bihan found another worm of this kind in the occipital artery ; rupture of the aneurism caused the death of the horse in less than ten minutes.

Abildgaard discovered the *filaria equina* between the dura-mater and the cranial arachnoid of a horse.

The agamous form of this worm has been encountered more frequently in the spermatic than in the renal arteries of the horse. Gurlt had already noticed the presence of these worms in the vaginal sheath. Aitken once saw an armed sclerostome in the spermatic artery of a foal, and Baird found one in the testicle of a horse. Clancy met with thirteen on the surface of the testicle of a three-year-old horse ; the gland was indurated, and the envelopes infiltrated. Brodie published a similar case. At the London Veterinary College one worm was found in the spermatic artery of the ass, and another in a funiculitis consecutive to castration.

It is remarkable the frequency with which these worms occur in the abnormal testicles of horses affected with abdominal cryptorchidism. We met with a case of this kind in May, 1883, and Simonin and Jacoulet encountered three in the space of two months, the testicles having undergone fibrous degeneration. On incising the testicle of a cryptorchid which was normal in structure, Degive met with an armed sclerostome. It would be interesting to ascertain the relation in frequency between cryptorchidism and testicular parasitism. What is

certain, is that the concealed testicles of horses affected with abdominal cryptorchidism often exhibit such alterations as fibrous tumors or serous cysts.

In stallions affected with hydrocele, Schmidt and Pottinger have remarked one or two specimens of this worm in the vaginal sheath. Their presence is easily explained by the communication that exists between the abdominal cavity and that sheath.

*Pathological Anatomy.*—The verminous aneurism is usually fusiform, sometimes globular or cylindroid. Its average size is about that of a walnut, though it may not exceed that of a pea, or it may attain the dimensions of a man's head.

It consists of a dilation of the affected artery, with hypertrophy of its walls. The dilation is sometimes absent, notwithstanding grave thrombic lesions in the vessel. (Durieux.)

The external tunic is usually thickened, and variably indurated, according to the age of the tumor. It adheres firmly to the neighboring parts, and is more or less confounded with the connective tissue.

The middle tunic is always hypertrophied, and sometimes very much so. Its thickness—which is ordinarily about a millimetre—may attain, and even exceed, two centimetres. At one time this thickening is due to simple hypertrophy of the tunic; at another time it is owing to inflammatory phenomena, with atrophy of the muscular fibres.

The internal tunic is nearly always altered. It may present every degree of endarteritis, and of regressive metamorphosis—from partial thickenings, and a white, milky tint, to ulceration, atheromatous transformation and calcification; the latter, however, is always rare, and may exceptionally assume an aspect of real ossification.

In the interior of the aneurism there is usually a fibrinous deposit—a thrombus—always adhering, though to a variable degree, to the internal membrane. It is more or less regular and consistent, and partially blocks the vessels; but there is always a canal in the middle of the passage of blood. This thrombus is often prolonged in the artery beyond the aneurism, both before and behind; and its external layers are capable of

becoming organized and undergoing softening. Its formation is essentially connected with the presence of the worms, the inflammatory processes, ulcerative and regressive, in the internal tunic and the dilation of the vessel. Decroly has published a remarkable case, in which the alteration in the aorta extended from the heart to the lumbar region.

In the aneurism, worms are found in nine cases out of ten; their average number is from 9 to 11, and varies between 2 and 121. When they are absent, the lesions have a chronic character; but when they are present, then these are more or less acute. The parasites are young, armed sclerostomes. They are rose-tinted, and their average length is from 1 to 3 cm.; their sexual characters are already well defined, but their genital organs remain rudimentary. They undergo one moulting in this situation, in which their buccal armature assumes its definite characters. Rayer and Diesing, who erroneously considered them as a distinct variety, named them, the former, the *strongylus armatus minor*, and the latter, the *sclerostoma armatum aneurismaticum*.

Amongst the aneurismal sclerostomes, some are almost free in the cavity of the artery; but the majority are more or less concealed in the layers of the thrombus, the head or tail usually projecting into the blood stream. They are also found in the hypertrophied walls of the artery, in either the internal or middle coats, or between these two. Sometimes nothing is found of them except the integuments they left after their final moulting.

The gravity of verminous aneurism is due to the risk of rupture of the vessels, and more especially, as Bollinger has pointed out, to their influence on the frequency and seriousness of colics.

The clot formed in the interior of the great mesenteric, or other arteries liable to these aneurisms, may throw off one or more fragments, which are carried by the blood, and constitute so many embola in the arterial ramifications passing to the intestine. According to the size of the embolus, the obliterated artery is itself more or less voluminous, and the disturbance set up more or less serious; there is sudden anæmia

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or ischæmia of that portion of the intestine to which the artery is distributed, and consequently paralysis of one or more of the sections of the digestive tube, the secretions and movements of which are suspended. Cohn and Panum have shown experimentally, in fact, that such are the results of embolism of the great mesenteric artery. The ischæmic portion of the intestine becomes at first pale, then of a dark-red color; the mucous membrane is swollen, there are hemorrhagic infarcts, serous exudates, ecchymoses, and sometimes a considerable increase of the organ in volume.

These phenomena, which are almost immediately consecutive, are related to the total absence of pressure in the capillaries of the artery, and even in the venous trunk succeeding them, as far as the next veinule, where the circulation can go on freely. The blood flows from this point towards the capillaries, where the tension is nearly nil, and soon causes engorgement, and even small hemorrhages. In consequence of all this disturbance, there are colics, which rapidly disappear if the obstructed artery is of small calibre; for the collaterals soon supplement it. The duration of these colics depends upon the facility with which this collateral circulation can be effected. It is sometimes easier in a large branch nearer the trunk of emergence, and this explains why an attack of colic that appears very serious will quickly disappear.

Otherwise, the establishment of the collateral circulation plays an important part in the post-ischæmic hyperæmia; and this collateral or compensatory hyperæmia is related to the increase of blood pressure in the vessels adjoining the obliterated one, as Feltz has shown. When it does not produce irreparable lesions the equilibrium is quickly restored, and all trouble disappears.

The circulation disturbances of the intestine cause a local paralysis in it, stagnation and consequent fermentation of its contents, with an abundant production of gas. The enteralgia induced in the healthy portions causes energetic contractions, which frequently lead to volvulus and invaginations. Friedberger and Frohner have often observed the rotation on its axis of the left part of the large colon—that is, its free portion,

which is, of all the intestinal divisions, the most liable to thromboses and embolisms. Paralysis of the intestine often brings about rupture of it, the stomach, or the diaphragm, owing to fermentation and enormous accumulation of matter and gas therein.

In animals which have been cured of colic for some time, old lesions in the form of thromboses are often found in the branches of the great mesenteric artery, as well as in the corresponding veins, these vessels being partially or totally obliterated, and around them pigmentation of the peritoneum and other organs is usually observed. Bollinger says that on a square centimetre of surface, there are sometimes found five or six arterioles or veinules so obliterated.

At the autopsy of horses which have died from colic, it is often difficult to discover the obliterated artery and the seat of the embolus, because of the great development of the intestinal vessels, and more especially on account of their congested conditions; so that care and patience are needed in this search.

The effects of the aneurisms, the thromboses, and the embolisms, are evidently subordinate to their situation. The presence alone of the aneurism and its clot reduces the calibre of the great mesenteric artery, and consequently diminishes the supply of blood to the intestine; this is sufficient to explain the chronic indigestion troubles observed, and these effects are all the more marked if the diminution in the lumen is extended to a ramification, but they are especially so if the vessel becomes completely obstructed by a detached fragment of the thrombus. But as the arteries of the small intestine anastomose freely by inosculation close to the concave curvature of the organ, embolism of one of the vessels is never a fatal accident. It is the same with obliteration of one of the two cæcal arteries; for the other, which anastomoses with it near the point of the cæcum, can assume its function, so that the attacks of colic pass off. But if the trunk of the right fasciculus of the great mesenteric artery is completely obstructed, the cæcum does not receive any blood, and death quickly ensues. The large colon receives its blood by the

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two cœlic arteries, which have an independent origin; so that it seldom happens that both are blocked at the same time. The floating colon would be exempt from the danger of aneurismal embolism but for its first artery, which is derived from the great mesenteric; the other arteries arise from the small mesenteric, in which aneurism is rare.

In cases of death from aneurisms, the alterations described above are most frequently found. There may also be rupture of a verminous aneurism and abdominal hemorrhage. But, as Freidberger and Fröhner have remarked, embolic colics may terminate in death in twelve to twenty-four hours, and before serious intestinal alterations have had time to occur. The intestine is, in such cases, usually very distended by gas, and obstructed.

Verminous aneurisms rarely give rise to characteristic symptoms, and their presence is often only recognized when rupture has taken place, which rapidly terminates in death from internal hemorrhage. On the occurrence of this accident, which coincides ordinarily with a severe effort, the animal crouches or sits on its hind quarters, knuckles over at the fetlock joints, and falls as if struck with paraplegia; the pulse is thready, limbs cold, visible mucous membranes blanched, etc.; and, generally, the last moments of life are marked by signs of profound and violent suffering. Aneurisms of the aorta appear to be more liable to rupture than those of the great mesenteric artery. As a rule, the blood flows into the peritoneal cavity, but sometimes rupture takes place directly into the intestinal canal. In eighteen cases collected by Bollinger, fifteen were of rupture into the abdominal cavity, and three into the intestine. The latter result might be recognized sometimes from the presence of blood which impregnates the fæces passed before death. Rupture of verminous aneurisms is attributable to the feeble resistance of their walls—which have lost their elasticity and contractility—and to the increased arterial pressure, resulting from diminution in the lumen of the vessel.

Besides the cases of rapid death, there have been noted—as symptoms of aneurism of the posterior aorta—decrease in

vigor of the animal, stiffness in movement of the hind quarters, difficulty and pain in micturition, arching of the loins, infiltration and intermittent lameness of one or both hind limbs, cramps, and signs of paraplegia; but these indications are not sufficiently characteristic to afford a sure diagnosis, though they may arouse suspicions, which will sometimes be confirmed by a rectal exploration.

Attacks of colic are the most frequent signs of verminous aneurism, and are the consequence of embolism in the branches of the diseased vessels, but neither are these symptoms characteristic. Sometimes the colic is sudden and acute, and disappears in a short time, to reappear after a variable interval; it depends upon local obstruction, which is soon compensated for by neighboring anastomoses and is usually ascribed to indigestion, as there is no appreciable cause. In other cases the colics are sub-acute and a little painful, and are due to sudden paralysis of a portion of the intestine. Death soon follows, or the disease runs a chronic course, and is characterized by difficult digestion, constipation alternating with diarrhœa, slight colic, some fever, and a capricious appetite. It is a kind of intestinal catarrh that may continue for days or even weeks, and terminates either in recovery or, which is more frequent, by marasmus, cachexia and death.

Lastly, in some cases, the embolic obstruction of the small arteries of the intestine, when often repeated, ends in hemorrhagic enteritis, to which the animal succumbs in several days or weeks. Friedberger and Frohner attribute to this state the following symptoms: Diminution of appetite or complete inappetence, increased thirsts, and rare defecation; the faecal pellets are small and dry at first, then become soft, pasty, and, later, sanguinolent and foetid; the urine is acid, and rich in phosphates; the fever is intense and persistent, and the pulse small and quick; the general debility increases, the animal becomes emaciated, and the abdomen retracted, and now and again there is coma. Frequently, after feeding, there is general aggravation of the symptoms and colic. Death is often ushered in by febrile paroxysms, muscular

tremors, shivering, coldness of the limbs, pallor of the mucous membranes, quickened, difficult, and rattling respiration, tumultuous beating of the heart, and considerable elevation of the rectal temperature.

To sum up, colics, which have their origin in disturbance of the circulation, have no particular signs which would allow them to be distinguished with sufficient precision in the complex group of abdominal complaints.

During the series of years that I have been in practice, the subject and treatment of colic in horses has been most unsatisfactory to me, and the literature of our text books would not satisfactorily come to my aid. Why, I have often asked myself, do horses become subjects of colic? Why do they, as a rule, become more severe until the last when they die? Why is it that the usual stereotyped colic drench or bolus will relieve, and then again it does not produce any impression whatever, apparently? Why is it that a case of colic recovers without any notice being taken of it?

Knowing that there is never an effect without a cause, I began to make my post-mortem examinations with more care, and open some of the leaves of the book of nature that I had been in the habit of passing over. The result of this closer observation revealed to me the fact that the vessels supplying the intestines with blood were frequently abnormal and showed aneurisms. Opening these dilations, I found parasites, nematodes, and, by referring to Cobbold, found that they were well known.

The question then presented itself to my mind, are we, as a body of practitioners, less observing than those gone before us? Do we look wise, give a decided opinion upon some every-day occurrence in practice with the positiveness as probably has been done in colics, and know as little about the cause and lesions produced? Are we not, as a body of veterinarians, more inclined to open the book of charges than that of nature? Do not think for a moment that I would in the least underrate the worth, or honesty of, the members of this profession. I think the fault lies, if there is any, with the authors of our standard works. In this particular instance the

subject cannot be said to be spoken of at all, and in one instance, the author, in referring to it, states that it does not occur in this country (England), although it appears quite frequently in Germany.

In referring to the journals of the present day (in English) one can almost count the articles on this subject on his hand, and that being the case, I came to the conclusion there must be a few veterinarians that are not aware of the importance of this subject.

The examinations and investigations I have made in this subject, with the able assistance of Dr. J. M. Parker, of Haverhill, only again very forcibly brings to my mind the fact that we must not take too much for granted, but make original inquiry for ourselves. It is not necessary that all the work shall have to be done with the microscope. It is not a fact, that in making post-mortem examinations we only look for a condition that, in our opinion, would cause death, and never once think enough about it to look and try to find out if there is a tangible cause for the effect produced. How often have we made a post-mortem examination and have been unable to find lesions that would satisfactorily explain the cause of death, when, possibly, by a closer examination, the cause might have shown itself?

Certainly there must be cause for this laxity in our post-mortem examinations, and I am inclined to think that, perhaps, the principal cause may be laid at the door of our instructors, in a great many instances; but oftentimes the pressure of business is the cause.

Can we afford to allow the coming generations of veterinarians to look back upon us as not having the same powers of observation as the generation gone before us? Why is it that the Continental literature is so much more instructive than the rest? The articles on record regarding this malady are interesting, but, with the exception of Dr. W. L. Williams, they are confined to unusual cases, where the parasites are very numerous, or the lesions gross. In Dr. W. L. Williams' article the several cases he cites are in animals that had been in pasture and the season wet, thus favoring, according to the

available life history of the *S. armatis*, the development of the worms. From my observation, it is not necessary that the animal should have been in pasture in order to harbor this worm, or at least within a few years. I am of the opinion that in the larger majority of deaths from colic, there will be found in the blood vessels evidence of, or the parasite itself.

It is not to the exceptional cases that I desire to call your attention, but to those of every-day occurrence.

The following cases may be of interest at this point as giving direct evidence, in my opinion, that the worm in question does produce lesions that are a cause of embolism. That the parasite is a cause of altered nutrition, and in many cases the cause of death.

I will also cite several cases from the pen of Dr. Parker, which, I think, sustains the opinion taken on this subject:

1. *History*.—Brown gelding, ten years, one thousand pounds, same owner for two years, never sick before with present owner.

Found the animal with abdominal pain, sharp and intermittent. Urine free, fæces scant. Looks round to the flank continually. Eructation of gas from stomach. Treatment would relieve for a while, but after twelve hours sickness he died.

*Post-Mortem*—twelve hours after death. Bloated; dark-colored serum escapes from the abdomen when opened. The large intestines normal in color, but distended with gas; small intestine black for a distance of about four feet, due to a twist; rest of the viscera normal. On opening the anterior mesenteric artery, found a thickening of the intestine, with a new growth, ragged, in which were found worms.

2. *History*.—Brown gelding, 6 years, one thousand four hundred pounds. This animal has been subject to fainting spells during the last four months. He would fall down, lay a few minutes, get up apparently all right, and resume his work for several weeks or days.

This day he went to work apparently well, but soon manifested pain, which gradually increased, with periods of ease, until noon, when death ensued.



I found this animal bloated, in severe pain, pulse and respirations hurried and short. Treatment did not produce any apparent relief, except for a short time.

*Post-Mortem*—four hours afterwards. Bloated; serum escapes when abdomen is opened; the small intestines dark blue, the large black; the veins of mesentery and intestines filled with blood; the mucous membrane of intestines black with blood; the sub-mucous membrane filled with straw-colored serum; the duodenum was contracted on itself for about eight inches, beginning at pyloric orificia; the thoracic cavity contained considerable clear serum; also the pericardium, which had spots of lymph on its surface; the endocardium dark-colored, with apparently calcareous deposits in its substance and on the valves. The superficial blood vessels of the brain were filled with blood; the third ventricle contained some light-colored serum, and its plexus was hyperæmic; the anterior mesenteric artery was the seat of an aneurism, the walls being thickened, the intima showing a new, ragged growth, which nearly filled its space, and was the seat of several nematoids.

3. *History*.—Grey gelding, 18 years, one thousand four hundred and fifty pounds. This horse has been subject to attacks of colic during the past three or four years, and would respond to the ordinary treatment readily. Killed on account of lost usefulness.

*Autopsy*—immediately after death. Melanotic tumors under tail and along the posterior aorta. Apparently calcareous deposits on the left valves of heart; otherwise, so far as I could see, was in a normal condition.

Dr. J. M. Parker, of Haverhill, reports the following:

4. *History*.—Black gelding, one thousand four hundred pounds. Was called at 3 P. M. Found horse thrashing and sweating profusely and in great pain; temperature 100° F.; pulse weak, and difficult to get, but about 80 to 90 per minute; ears and limbs cold; membranes pale; eyes wild and anxious; prognosis unfavorable. Applied hot packs and gave morphia. Temperature gradually rose to 102° F.; pulse more weak and rapid; he breathed hard, and sighed occasionally, and

trembled, but did not attempt to lie down. These symptoms gradually grew worse, until 8:30 P. M., when he died.

*Autopsy.*—Body tympanitic; abdominal cavity contained a quantity of serous fluid; mesenteric blood vessels filled. Small intestines were, in places, almost black in color; the serous membrane showed numerous hemorrhagic spots. The serous membrane of the colon, in region of large blood vessels, showed exudation and extravasation of blood and serum. The mucous membrane was easily torn, and almost black in color, with an exudate of lymph in sub-mucous coat. Thorax and pericardial sac each contained considerable quantity of serum, but seemed otherwise normal. Aorta: The intima was of an even red rose color, and on opening the anterior mesenteric artery several warty excrescences were found, loosely adherent to the intima. The walls were much thickened, and when cut open a large clot was exposed, and entangled in the clot were several nematoids. The intima of the artery above the clot was of an even red color, while immediately below the clot the membrane was seemingly normal in color.

5. *History.*—Black gelding, sixteen years; ten hundred and fifty pounds. For past two or three years, after having done extra work, he would leave his feed, and in course of a week or ten days would again be of service. This A. M. showed symptoms of abdominal trouble, with acute pain, hurried respiration and quick pulse. He did not get any ease during his sickness, and at times was almost uncontrollable. The duration of sickness was twenty-four hours.

*Post-mortem*—twelve hours after death. Bloated; dark-colored serum escapes from abdomen when opened. Mesentery dark; both the small and large intestines were dark in color and the mucous membrane of the same was very soft and dark. The contents of intestines very pungent. Kidney was soft; liver dry and hard; thorax contained quantity of dark fluid; muscles of heart soft and easily torn. Intima of posterior aorta deep rose color. No evidence of *strongylus armatus* found.

6. *History.*—Black gelding, twelve years; eleven hundred

and fifty pounds. Been subject to colic for some time. Called at 4 A. M. Found him bloated, cold sweat, mucous membrane pale, pulse fast and hard, respiration quick and labored. Died at 9 A. M.

*Autopsy* at 4 P. M. Bloated. Serous coat of intestines dark blue, and blood vessels of mesentery and intestines filled with blood. Mucous membrane of large intestines apoplectic, with exudation of serum into the sub-mucous membrane. Rest of viscera apparently normal. Found aneurism of anterior mesenteric artery; walls thickened; the intima showed a new foundation, ragged in appearance, which harbored several worms, and dark-colored clots of blood were found below the thrombus.

7. *History*.—Bay gelding, twelve to fourteen years; eleven hundred pounds. Sick all day, not much pain, uneasy. At 8 P. M. pulse 36, respiration 18. Slightly bloated, easy passes flatus. No fæces morning since. Gave usual treatment and went away. 4 A. M. night man was awakened; went to the horse, died soon after.

*Post-mortem*, 11 A. M. same day. Bloated. Removing abdominal muscles, large quantity of dark-colored serum escaped, undigested food around liver and stomach and small intestines. Stomach with small rupture, the edges rough, having clotted blood under external coat of stomach. Small intestines were blushed and contained a quantity of light-colored mucous, sweetish to smell. The M. M. B. of large intestines, colon and cæcum, were apoplectic, and fæces fluid. Liver soft and friable. Rest of viscera apparently normal. The internal lining of anterior mesenteric artery thickened, and presented a cauliflower look, covering a space of about a quarter of a dollar, which had in its meshes several parasites. Growths were found on bicuspid valves, hard and glistening.

8. *History*.—Brown gelding, nine years; eleven hundred pounds. Taken sick 1 A. M. Saw him 3 A. M., and found him bloated, dull pain, up and down. Pulse small, hard and 72. Respiration labored and short, cold sweat, visible M. M. B. pale. Usual treatment, with relief for a while, but gradually failed, until death ensued at 8 A. M.

*Post-mortem* at 4 P. M. same day. Visible M. M. B. pale; bloated; mucous discharge from nose and mouth. Opened abdomen, found peritoneum itis. The colon, serous coat dark blue; mucous coat apoplectic. Small guts, serous coat dark in color, mucous membrane normal. Rest of viscera apparently normal. Left side of heart contained a straw-colored clot. Anterior mesenteric artery aneurismal, containing a cauliflower growth with several small parasites, and beyond this found a firm, dark-colored clot filling artery.

This horse was taken sick with colic the fifth; recovered, went to work the sixth, but had to be returned in a few hours; the ninth he again resumed his work, and continued apparently all right until the morning of the twelfth, when he died as above stated.

9. *History*.—Bay gelding, five years; ten hundred and fifty pounds. Saw case at 6 P. M. Pulse full, strong; respiration a little hurried; urinates freely, fæces plenty. Restless, up and down. Prescribed for him, which gave ease for a while. 9 P. M.—Bloated; gave drench, slacked away, and remained easy for a while, but continued in dull pain. 1 A. M. the next day, breathing hard and fast, sweating profusely; again relieved him and he remained comfortable until about 10 A. M., when I repeated the treatment which rendered him comfortable until 4 P. M., when he had a collapse without bloating. Again did my best, which caused him to remain quiet until 4 A. M. of the following day, when he threw himself down, pounding his head and striking with fore feet, while the hind legs remained very stiff until a short time before death, which took place at 7 A. M. the same day.

*Post-mortem*—thirty hours after death. Bloated. The abdominal viscera, with the exception of about eighteen inches of small colon, were apparently normal. That part of the gut was inflamed and the contents dry. The M. M. B. of cæcum was well covered with dark, raised spots, and contained quite a number of parasites.

One of the branches of the anterior mesenteric artery contained a growth on its internal surface, which nearly filled its space, and in and around this was found parasites quite active.

10. *History*.—Brown gelding, six years; fourteen hundred pounds. Taken sick about 5 P. M. Saw him at 6 P. M. Found discharge of undigested food from both nostrils; anxious expression. Pulse full, about 80. M. M. B. of eyes and mouth pale. Breathing short, cold sweat, no bloating to be seen. 8 P. M, bloated; hurried, short breath; pulse imperceptible; cold; M. M. B. of eyes still pale, that of mouth regained color; stands up braced. Tapped; no relief given. Died at 9 P. M.

*Autopsy* next day at 11 A. M. Bloated; part of small colon protruding from anus; opened abdomen, escape of bloody serum and undigested food. Vessels of mesentery full of blood, those of small intestines enlarged. Colon and cæcum apparently normal, as well as kidney, spleen and liver. Stomach ruptured, with blood and serum under torn edges. The stomach contained quite a number of bots. Small intestines, except part of duodenum, full of bloody serum. Large intestines, contents semi-fluid. Cæcum contained quite a number of parasites (*S. armatus*). Rest of viscera apparently normal. The posterior aorta rose color inside, and clots of blood where anterior mesenteric artery given off. Anterior mesenteric artery contained a ragged, new growth, with walls thickened, but did not find a parasite.

11. Report of cases from the note-book of Dr. J. M. Parker:

Was called June 6th to see a case of colic, and found him presenting the usual symptoms, and no history of having before had colic. He was under treatment for eight days, with days of ease and apparently convalescing, but death ensued the 15th inst. Autopsy the following day.

12. Roan mare. Not subject to colic; taken on the road; was very violent, and lived about four hours.

*Autopsy* forty-eight hours after. Portions of small intestines almost black in color; blood vessels filled. Walls of anterior mesenteric artery thickened and roughened, with blood clot, with aneurismal dilation about the size of a hen's egg, and entangled in the clot there were several nematodes (*S. armatus*). No bloating; opening the abdominal cavity, there was a good deal of post-mortem discoloration. Bowels were full of watery fæces. Mucous membrane was excoriated



and much inflamed. Diaphragmatic flexure of colon was adherent to abdominal wall, where there was a patch of intense red discoloration, and in the centre was an abscess opening into the walls of the colon, and containing two or three ounces of creamy pus. On examining the aorta and anterior mesenteric artery, there was a clot and aneurism of the cœliac branch of the anterior mesenteric. The cœliac artery was full of dark-colored blood, and about eight inches down a nematode was found (*Filaria papillosa*). Immediately below this there was a long, slender, straw-colored ante-mortem clot.

Dr. C. W. Stiles reports on the *Filaria papillosa* as follows: "This parasite is the *F. Equinæ* (*papillosa*) female. As a rule, the nematode is found in the body cavity, but is quite frequently found in the peritoneal cavity, more rarely in the pleural cavity, of the horse, mule and ass. Generally, only a few specimens are found in one host; occasionally, however, a large number are found. The female are much more frequent than the male. The same parasite has also been reported from the arachnoid, subperitoneal connective tissue and diaphragm, and the nematodes found in the eye are thought to be embryos of this species."

Baruchello also believes that the nematodes found in the cutaneous helminthiosis of the horse also belong to this species.

Kavanagh mare. Taken suddenly sick about 2 P. M. with flatulent colic. Remedies such as chloral hydrate and arom. spt. of ammon.; later, used turpentine and linseed oil, and carbolic acid, with rectal injections of linseed oil and trocar and camila; diagnosed twist of bowels. She died about 7:30.

*Autopsy* held next day. Showed abdominal viscera fully distended and tympanitic; not much inflammation; no peritonitis. In one place on intestines there was a small patch of hæmorrhagic inflammation. The gastro-splenic omentum was intensely inflamed and dark in color. Lungs slightly congested; heart distended full. On opening intestines they were found to contain a quantity of liquid fæces. Stomach was distended and contained gas and fermented food. Spleen was enormously distended, capsule tense almost to bursting.

This distension was especially well marked at the apex, where it was full to bursting. It was here that the gastro-splenic omentum was dark red in color and intensely injected. On opening the posterior aorta the celiac axis contained a quantity of clotted blood, and in one of the branches the intima was thickened and roughened in places, and adhering to and partially concealed by the roughened intima, there were several nematodes. The anterior and posterior mesenteric arteries were normal.

13. On August 12th I was sent for to see a mare which I found suffering a good deal of pain, and presenting all the symptoms of acute lymphangitis. Temperature,  $101\frac{1}{2}^{\circ}$ ; pulse hard and full, and about 60. Gave linseed oil, with belladonæ and veratrum viride, and ordered continuous bathing with hot vinegar and water, and soap and camphor liniment.

The next day I got word that she was better; was eating better and seemed brighter, and the swelling was much reduced.

The same evening I got word to come out at once, as the mare was down, unable to get up, and was thrashing badly. I found her lying on her sore leg, trying to get up, and becoming almost frantic in her endeavors. I at once turned her over on the other side, when she got up with a little difficulty and at once began eating hay, and whinnied when water was brought.

The following morning, much to my surprise, I received word that she was dead, and I immediately went out to make an autopsy.

*Autopsy.* I found body tympanitic, swelling in leg much reduced. Owner said she died easily, without struggling; so much so, that, although he was in the same barn, he did not know she was dead till he went in to look at her. On opening the abdominal cavity, there were no lesions to be observed in the abdominal viscera, except one small patch of redness, with a few hæmorrhagic spots at the pelvic flexure of the colon. Thorax: the lungs were dark-colored and congested; the heart full on both sides. In the anterior mesenteric artery there were two aneurismal dilations, and in them

there were several specimens of the *strongylus armatus*. In the sub-mucous coat of the cæcum there were several well-marked prominences, and through the thin membrane the coiled-up worm could be distinctly seen. Through want of tools and time I did not take out the brain.

14. Horse belonging to American Express Co., aged; died suddenly on the street while working; (the day was cool and cloudy;) the horse fell down "all in a heap," with his legs under him; it got up again, but it immediately fell, and died without a struggle.

*Autopsy* held next day, eighteen hours after death. Body tympanitic, abdominal organs normal, no parasites in intestines; lungs congested, heart empty, muscles dark; aorta, normal; kidneys, normal; on the base of the brain around the pons there was a quantity of congestion and effusion. In the third ventricle, there was a teaspoonful of serous effusion. The blood vessels in and around the vermiform process and the lateral lobes of the cerebellum were intensely congested; No strongyles were discovered.

*Post-Mortem of Horses Found at the Knacker.*

Brown gelding; aged; killed; *S. Armatus* abundant in cæcum; aneurism, anterior mesenteric artery with worms.

Gray mare, over drove; died of exhaustion; no evidence of *S. armatus* in cæcum; small aneurism, anterior mesenteric artery, but no evidence of parasite there.

Owner unknown; died of colic; apoplexy of large intestines; *S. armatus* plenty in cæcum; anterior mesenteric artery aneurismal, with worms.

Bay gelding, old owner unknown; died of colic; aneurism post aorta at point where anterior mesenteric artery given off, size of a large pear, involving anterior mesenteric artery, with thrombus and strongyles present, and one of diverging arteries completely plugged; no *S. armatus* found in cæcum.

Bay gelding, killed for lost usefulness; strongyles in cæcum; aneurism anterior mesenteric artery, with thrombus and strongyles.

Gray gelding, died from effects of heat; no evidence of parasite in question.

Mr. Mather, M.R.C.V.S. in *Veterinarian* for 1857, Vol. XXX., page 190, writes as follows:

"About twelve months since, when practicing in the South, the following cases came under my notice, and never having read in any of our veterinary works, or heard mention made, of such a disease (excepting that veterinary surgeons had occasionally met with it), I thought perhaps you might deem the following particulars not unworthy of a place in the *Veterinarian*.

"It was thus only by chance that I was enabled to learn the nature of the complaint the animals were laboring under, and that in the following manner: The subjects of the disease were blood foals varying in age from seven to sixteen months, and one of them having been found dead in the field, I was sent for to make a post-mortem examination, it being suspected that the animals had been poisoned. On examining the foal previously to opening it, I found the body to be very much emaciated, and that the abdomen was greatly enlarged. On percussion of the belly, I detected the presence of a small quantity of gas, mingled with a fluid which I concluded was of a serous nature. From this circumstance, I came to the conclusion that the animal had died from ascites, but on opening it, I found the abdomen to contain quite a gallon of pure blood. On removing the viscera, I at once saw that the hemorrhage had come from a rupture of the posterior aorta, just in front of the renal arteries. I dissected out the vessel to nearly its whole length, and on examining it, I thought at first that simple aneurism existed; but on cutting into dilated portion, near to the rupture, I found, much to my surprise, that the vessel was completely choked with myriads of small worms, similar in appearance to the filaria which we find in the bronchial tubes of calves suffering from bronchitis or husk. The internal coat of the vessel was considerably thickened; in fact, it appeared to be lined with a false membrane, which, no doubt, had been caused by the irritation set up by these creatures. In all of the arteries

given off the main trunk were more or less of those parasites.

"About a fortnight from the time of being called to this case, I was sent for to see another of these foals, which, the man informed me, had been found down and unable to rise. On examining it, I observed that the pulse at the jaw was nearly imperceptible, the mucous membranes blanched, and the body very cold. I informed the owner that I was sure the foal was dying from internal hemorrhage, and that, in my opinion, it was suffering from the same complaint as the last. We managed, however, after some difficulty, to get the animal on his legs again, and immediately we had done so, it commenced voiding a large quantity of blood from the penis. Seeing that there was no chance of recovery we had the foal destroyed, when I made my examination and found the bladder distended to repletion with blood. The right kidney was twice its normal size, and on cutting into it I found it filled with similar parasites. The renal artery was quite as large as one's finger, and it, also, contained a large number of these creatures. The posterior aorta contained thousands of them.

"Two other foals, which were on the premises, I felt sure from their appearance were laboring under the same complaint, and the owner wished me to try if I could do anything for them.

"I must here say that these foals had been taken off the mares at about six months old, and placed on some cold, wet lands, where they had remained up to the time of my seeing them.

"The two surviving ones I had taken up and put into the bay of a barn, so that they could be supplied with crushed oats, pea meal, and good hay. I first gave them, for three successive mornings, ol. tereb., ol. lini., and afterward administered for a few days the following tonic—ferri sulph., pulv. gent. These remedies were alternately employed for a fortnight, and I considered that the animal was improving under their use, but at the time the owner saw fit to dispose of the foals, so that I afterward lost sight of them entirely."

[EDITOR.—Mr. Mather will find in the records of *Veterinary Medicine*, several analogous cases to those he has related.



They are not uncommon, and have frequently been brought before the notice of the students of the college by the professors.]

Dr. W. L. Williams in his article says :

"How often these parasitic thrombi occur amongst our horses, we do not attempt to say; we have only looked for strongyles where they have been expected, and have not been disappointed in any case. A positive diagnosis is generally available, by manual exploration per rectum, or by pulse, and respirations are more uniformly accelerated than in colic, and there is a peculiar, anxious expression about the animal that bodes no good, and leads one to conclude that he is dealing neither with ordinary colic nor enteritis."

I think Dr. Williams is right when he says, "we do not know how often these parasitic thrombi occur amongst our horses," for the reason that there has never been enough careful post-mortems to answer the question. I am not surprised that he finds them so readily when looking for them, for he says, "where expected they were always found."

I must differ with him when he says a positive diagnosis is generally available, by manual exploration per rectum, or pulse, respiration, and general expression of the animal. I think that, in most cases, the diagnosis follows death, although one is justified in expecting the presence of the parasite in the majority of cases that die from colic.

Dr. A. W. Clement, in *Journal Comparative Medicine and Surgery*, Vol. XIII, page 186, cites a very interesting case of rupture of the anterior mesenteric artery, but here no unusual case present itself.

Dr. J. T. Duncan, in *Veterinary Journal*, March, 1887, cites several interesting cases that do not correspond to the everyday occurrence of the practitioner, although the lesions produced were due to *S. armatus*.

Dr. R. W. Burke, in *Journal Comparative Medicine and Surgery*, Vol. XIII, has an article on this subject, but does not cite any cases that have come under his observation.

Dr. C. A. Cary, in the same journal, June, 1892, cites two post-mortems of colts that never had colic; one died from

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tetanus, the other was killed on account of malformation, with aneurisms of anterior mesenteric in both, and living sclerostomes. Using these cases for an analogy, he thinks that the theory of verminous aneurisms causing colic should be more carefully looked into.

Mr. M. Laquerriere, in his article on colic, *VETERINARY REVIEW*, Vol. IX, page 222, says—"As to the predisposition produced by a diseased condition of the great mesenteric artery (aneurism), upon which Zundel places so much weight, we attach but little importance to it. But, on the contrary, we recognize the predisposition accompanying advanced age."

Prof. F. Smith, Army Vet. School, Aldershot, has a very interesting article in *Veterinary Journal*, for July, 1892, on "Intestinal Obstruction in the Horse," and I fail to find that he makes mention of *Strongylus armatus* as a cause for the same. He does say that "The rapidity of death depends entirely upon whether the blood supply to the bowel is partly or completely cut off, viz., a partial or complete twist." I am of the opinion that the twist to which he attaches so much importance is a result due to enteralgia, and that due to altered nutrition of the part. It is a fact that this parasite is not a stranger, but is readily found if looked for, and is a cause of thrombosis and embolism.

Mr. Hunting, in discussing Prof. Smith's paper, "held that the impacted food was the cause of the spasm, or the pain, and that the proper thing was to remove the cause, even if they inflicted a little more pain." Does not the establishment of collateral circulation to the afflicted parts cause a return of normal state, and pain then cease, allowing that it is due to an embolism? Who can make a positive diagnosis of this condition during life?

Mr. H. G. Rogers said he was rather skeptical as to the condition called twist, for the report came from Knacker in abdominal cases—"Twist, sir;" and this is similar to the report from this side of ruptured diaphragm. He thought that sluggish liver and defective teeth were the causes of intestinal obstruction.

Prof. Macqueen thought there was another form of ob-

struction which demanded a little more attention than it usually received, and that was the form of obstruction due to aneurism of the branches of the mesenteric artery. He suggested that more careful post-mortems might reveal a cause that is often overlooked.

Dr. Wm. Willis, M.R.C.V.S., in *Veterinary Record*, July 16, 1892, in criticising Prof. Smith's paper, remarks the entire absence of any reference to the condition of the circulatory apparatus of the bowels. He says, "I am inclined to think mesenteric aneurism is much more frequently responsible for the death of our patients than is generally supposed. Certainly, it is not the rare disease of old horses which the scant notices of our text books might lead one to believe. It is a most common condition. Physiological experiments teach us that when the blood supply to the bowel is suddenly interrupted, violent intestinal movements result, and that, if the interruption be continued, a paralytic condition of bowel results. I would suggest that the first result is probably the precursor of twist, and the second is certainly the explanation of some cases of obstructed colon.

"How far mesenteric aneurism, thrombosis, and embolism, are likely to give rise to the conditions referred to above, and to what extent they must be held responsible for the fatal termination of many of our bowel cases, is a matter which deserves more attention at the hands of the British veterinarian than it has hitherto received."

Dr. Willis cites seven post-mortems; five eight years old and under; two more aged. He found six with aneurisms, one of them with strongyles; the other one revealed a perfectly round hole about the size of a sixpence, in the side of the ileum, near ileo-cæcal valve. I am of the opinion, had his examinations been made with a little more care, he would have found the worm in each case; although not necessarily at the point of aneurism.

J. E. Miller, M.R.C.V.S., in *Veterinary Record*, June 18, 1892, cites an exceptional case of mesenteric tumor with aneurism of anterior mesenteric artery.

Cobbold says: So practically important, however, do I

deem Bollinger's summary of the whole subject in relation to the hippopathological aspects of parasitism, that I feel it desirable to record his conclusions at full length. No professional man having any pretensions to a knowledge of the veterinary art—or, for that matter, to parasitism in relation to sanitation—should remain uninformed on this subject. Dr. Bollinger's results are thus stated :

1. The worm aneurism of the visceral arteries of the horse, existing in 90 to 94 per cent. of adult horses, has a general correspondence with the aneurisma verum mixtum of man. It is, however, distinguishable from the same by its seat, cause, character of its walls, contents, and mode of termination. The worm aneurism arises from a parasitism of the palisade worm (*Strongylus armatus*), owing to an inflammatory affection of the arterial walls which it causes, and which one may describe as a recurrent traumatic endoarteritis. This holds good for all the visceral arteries, with the exception of the abdominal aorta, in which an aneurism may arise from local increase of pressure.

2. The formation and further development of the aneurism is also favored by the narrowing of the arterial calibre, which is caused by the inflammatory swelling of its walls, and also by the contemporaneous formation of a thrombus (clot), this latter still further supporting and exciting the inflammation of the inner coat.

3. Whilst the causes above mentioned (and of these more particularly the continued presence of the palisade worms and the plugging of the smaller arteries by thrombi) favor the growth of the worm aneurism, the small size of the same, notwithstanding the years it has existed, is explained by the considerable hypertrophy of the muscular layer, by the tough fibrous capsule formed in many cases by the connective tissue of the mesentery, and by the adhesion of the intestines to the perpendicular and free-lying anterior mesenteric artery ; in particular this last named circumstance does not allow of any very considerable shortening of the mesenteric artery, which would necessarily be accompanied by considerable dilation of the arterial tube.

4. The favorite seat of the worm-aneurism is the trunk of the anterior mesenteric artery, directly at its origin from the abdominal aorta. Most frequently that part of the arterial trunk is dilated from which the arteria ilea, cæcales and colica inferior (arteria ileo-cæco-colica) arise, less frequently the arteria colica superior at its origin, and the arteries of the cæcum and colon in their course in the meso-cæcum and mesocolon. The verminous aneurism also occurs in the cœliac artery (Bauchschlagader), in the posterior mesenteric artery (Gekrosarterie) in the renal artery, and in the abdominal aorta. A horse is not infrequently afflicted with several aneurisms of this kind at one and the same time. Thus in one case (described by Bollinger) there were six of these aneurisms affecting the abdominal aorta and its branches in the same horse. The verminous aneurism may occur from the sixth month of life onwards, and with increasing age; the number of horses free from such aneurisms becomes continually smaller.

5. The aneurism varies in size from that of a pea to that of a man's head. The dilation is, as a rule, equal on all sides, the form being usually thumb-shaped or bottle-shaped, passing into that of a cone or long oval figure. This general configuration is principally due to the free and movable situation of the anterior mesenteric artery.

6. In contrast to aneurisms in man, the walls of the worm-aneurism in the horse are almost without exception indurated. In addition to the mesenteric connective tissue, all the arterial coats, and especially the tunica media, generally take part in this induration. The hypertrophy of the media, which stands unique in respect of what is known of arterial disease, forms a compensatory action of the arterial wall, analogous to the muscular hypertrophy of the heart in valvular disease. This change in the media points to the fact that in the development of aneurism in man the early disturbance of the nutritive process in the tunica media is not a less essential factor than the degeneration of the tunica intima.

The changes in the intima are the least constant. They present all stages of progressive and retrogressive metamor-



phosis, from simple induration to ulceration and calcification. In the walls of the verminous aneurism one not unfrequently finds all the pathological changes exhibited by atheroma in man. Calcification is a common form of the retrograde process, and, in very rare cases, may pass on to the formation of true bone.

7. In addition to the palisade worms, one almost constantly finds a parietal thrombus contained in the aneurism. It covers the inner wall either partially or completely, being in the latter case perforated for arterial offshoots. The clot may occlude the artery, and it is not unfrequently continued into the arterial branches (peripherally) or into the aorta (centrally). Amongst the various changes that the clot undergoes, organization of its outermost layer and softening are the most frequent. The constant occurrence of this clot is due to the presence of the worms, to the inflammation, ulcerative and regressive affection of the intima, and to the dilatation of the arterial tube.

8. The palisade worms are seldom absent from aneurisms of the horse. Their not being present is merely an accidental circumstance. On the average, nine palisade worms go to a verminous aneurism, and eleven in the horse. The highest number of worms found in one horse reached 121. Not infrequently, also, palisade worms, or their coverings in the form of larval skins, are found in the aneurismal walls. The immigration and emigration of the palisade worms out of the intestine into the aneurism, and the reverse, takes place, probably, as a rule, within the arterial circulation. The path of the worm does not appear to be always the same, inasmuch as they can also wander through the peritoneal cavity. The worms found in the aneurismal walls are probably mostly only strayed specimens.

9. From a comparative pathological-anatomical point of view, the developmental history of the aneurysma verminosum proves that a circumscribed endo-arteritis can determine the formation of an aneurism.

10. Like the worm-aneurism itself, atheroma of the abdominal arteries arises from a circumscribed acute and sub-

acute endo-arteritis. The histological changes in the secondary atheroma of horses are perfectly analogous to those of the spontaneous atheroma of man. Idiopathic atheroma, as seen in man, does not occur any more in the horse than in the other domestic animals. Atheroma in the horse is always secondary. To be sure, one observes an idiopathic chronic endo-arteritis in many abdominal arteries of the horse, which, however, never exhibits indications of atheromatous degeneration.

11. In consequence of its position, the worm-aneurism of horses is not open to physical examination, and, on that account, cannot be diagnosed by physical signs; moreover, it offers no characteristic symptoms. Its termination by rupture is extremely rare, the aneurisms of the abdominal aorta being more disposed to rupture than those of the anterior mesenteric artery. Of eighteen cases of known perforation, fifteen opened into the peritoneal cavity, and three into the bowel. The dangerous symptoms of the worm-aneurism are exclusively due to embolism and thrombosis of the affected artery, arising from the parietal clot. The latter becomes especially dangerous through its increasing size and the softening which accompanies it. The absorption and shrinking of this parietal clot, be it organized or not, is materially assisted by the high pressure to which it is exposed.

12. The very marked symptoms of vascular obstruction—the sero-hemorrhagic intestinal infarct—in embolism and thrombosis of the mesenteric arteries, are easily explained by paralysis of the muscular coat of the intestine, by the absence of paucity of valves in the portal vein, by the readiness with which meteorismus (orflatus) arises, especially in herbivora, and by the loose consistence of the intestinal walls of villi.

13. The occlusion of the intestinal arteries, especially that arising suddenly, always has for its result a partial or complete paralysis of the portion of bowel which they supply. The palsy of the intestine causes the forward movement of the intestinal contents to cease, a stoppage of the fæces, a hindrance to the discharge of fæces and gas, and also that ex-

ceedingly dangerous formation of gas (within the intestinal tract) which in the herbivora is so abnormal, both quantitatively and qualitatively.

14. In embolism and thrombosis of the mesenteric arteries the symptoms during life are entirely identical with those observed in the so-called colic of horses, as has been determined by numerous observations. The partial paralysis of the bowel, which is brought on by the embolism and thrombosis of the mesenteric arteries, forms in great part the chief and leading feature of the series of symptoms known as the "colic" of horses. The palsy of the bowel which arises this way may explain also the frequent ruptures of the digestive canal and the greater number of its changes in position. The latter are specially favored by the structure of the abdominal viscera in the horse.

15. The old changes which one finds in the peripheral branches of the anterior mesenteric artery, in the form expired and partly absorbed embolic and thrombotic processes (pigmentation, arterial and venous thrombi), particularly in connection with those arteries which are seats of the aneurism, decisively prove that the large majority of colics resulting in recovery, so far as they do not depend upon known injuries, are caused by paralysis of the bowel from embolism and thrombosis. The sudden occurrence, course, and result of these kinds of colics also testify to their embolic origin.

16. The œdematous, inflammatory, and hemorrhagic processes that one often finds described as the cause of death in colic, almost exclusively depend on thrombosis and embolism of the mesenteric arteries, the cases forming about forty to fifty per cent. of all fatal colics.

17. The rapid course in fatal colics, as well as the preponderating symptoms of dyspnœa in cases of recovery, is finally due to the abnormal development of gas in the alimentary canal. In addition to the diminution of the respiratory surface by the lofty position of the diaphragm, a direct poisoning (carbonic acid and sulphuretted hydrogen), probably contributes to the intensity of the symptoms and the rapid course by diffusion of the abnormally developed gas out of the intestinal canal into the blood.

18. The variety of the anatomical derangements caused by embolism and thrombosis of the intestinal arteries is faithfully mirrored by the variety of the clinical symptoms and the different degrees in the intensity and course of the colic.

19. Amongst every 100 horses afflicted with internal disease, 40 are ill with colic. Among any hundred deceased horses, 40 have perished with colic, and among 100 colic patients, 87 recover and 13 die. The figures prove that neither amongst the epizootic nor sporadic diseases of horses is there any other affection which occurs so frequently, or claims anything like so many victims. Like the frequency of the worm-aneurism, the amount of disease and mortality increases with advancing age. The etiology of the colic of horses finds in the thrombosis and embolism of the mesenteric arteries, with the consequent paralysis of the bowel, an all-sufficient explanation, whilst the causes of colic hitherto accepted were, for the most part, insufficient.

20. In a great number of cases, the thrombus of the worm-aneurism is continued past the mouth of the anterior mesenteric artery, into the lumen of the aorta, and, as such, is the exclusive cause of the embolisms of the pelvic and crural arteries which bring about the intermittent hobblings (the author says "intermitterenden hinken," not "hahnentritten," the usual equivalent term for springhalt). Considering the excessive frequency of the thrombus being continued into the aorta, it becomes highly probable that a great part of the diseases and lameness of the posterior extremities ("Hutt und Kreuzlahme, unsichtbarer Spath, etc.," which may be rendered "sciatic and hip or spinal lameness, obscure spavin, etc.,") are due to occlusion of the arteries.

21. Owing to the fibrous thickening of the connective tissue of the root of the anterior mesenteric round the aneurism, and to the considerable size of the latter, disturbances of the innervation of the intestine, (as well as) hindrances to the passage of the chyle, and irregularities in the portal of many chronic disturbances of digestion in horses.

22. Considering the great losses and heavy social disadvantages that are occasioned by the colic of horses to the

horse-breeder, to agriculture, and to the general welfare, it is of the highest importance to discover means which should prevent the introduction of the embryos with the food, and, as a consequence, the migration of the palisade worms into the mesenteric arteries of the horse.

In calling your attention to this subject, old as it is, I hope I have not encroached too much on your valuable time. If I have been able to cause one of you to ask yourself: Can the statements made be sustained by post-mortem examination?—for I think we have been able to—then, with the interest of your profession at heart, I hope you will open the Book of Nature, and determine the fact for yourselves.

#### EXPLANATION OF PLATES.

##### PLATE I.

- Fig. 1.—Male: *a*, caudal pouch; *b*, spicula.  
 Fig. 2.—Female: *a*, vulva; *b*, anus.  
 Fig. 3.—*a*, capsule; *b*, longitudinal line or rib; *c*, anterior teeth; *d*, anterior cilia; *e*, papillæ; *f*, posterior papillary bodies or plates; *g*, anterior armed pharyngeal ring; *h*, pharyngeal capsule; *k*, anterior constricted portion of œsophagus; *l*, posterior ventricle or bulb.  
 Fig. 4.—*c*, anterior teeth; *d*, anterior cilia.  
 Fig. 5.—*b*, longitudinal line or rib; *f*, posterior plates.  
 Fig. 6.—Anterior cilia.  
 Fig. 7.—Anterior papillæ.  
 Fig. 8.—Fine anterior teeth.  
 Fig. 9.—Caudal pouch of male; *b*, spicula.  
 Fig. 10.—Posterior moiety of female; *b*, anus.  
 Fig. 11.—Undeveloped or agamous worm, in thin transparent membrane, which is shed on reaching maturity.  
 Fig. 12.—Ovum.

(*These drawings are original, and made by Dr. J. M. Parker.*)

##### PLATE II.

- Fig. 1.—Caudal extremity of the male *Sclerostoma equinum* (Neumann.)  
 Fig. 2.—Fragments of the cœcum of a horse showing the tumors of different sizes due to the sclerostomes, as well as parasites fixed on the mucous membranes (Neumann.)

##### PLATE III.

- Fig. 1.—Verminous aneurism of the great mesenteric artery; one-half natural size (Railliet.)  
 Fig. 2.—Abdominal aorta of a horse with its ramifications (Neumann.)



# PLATE I

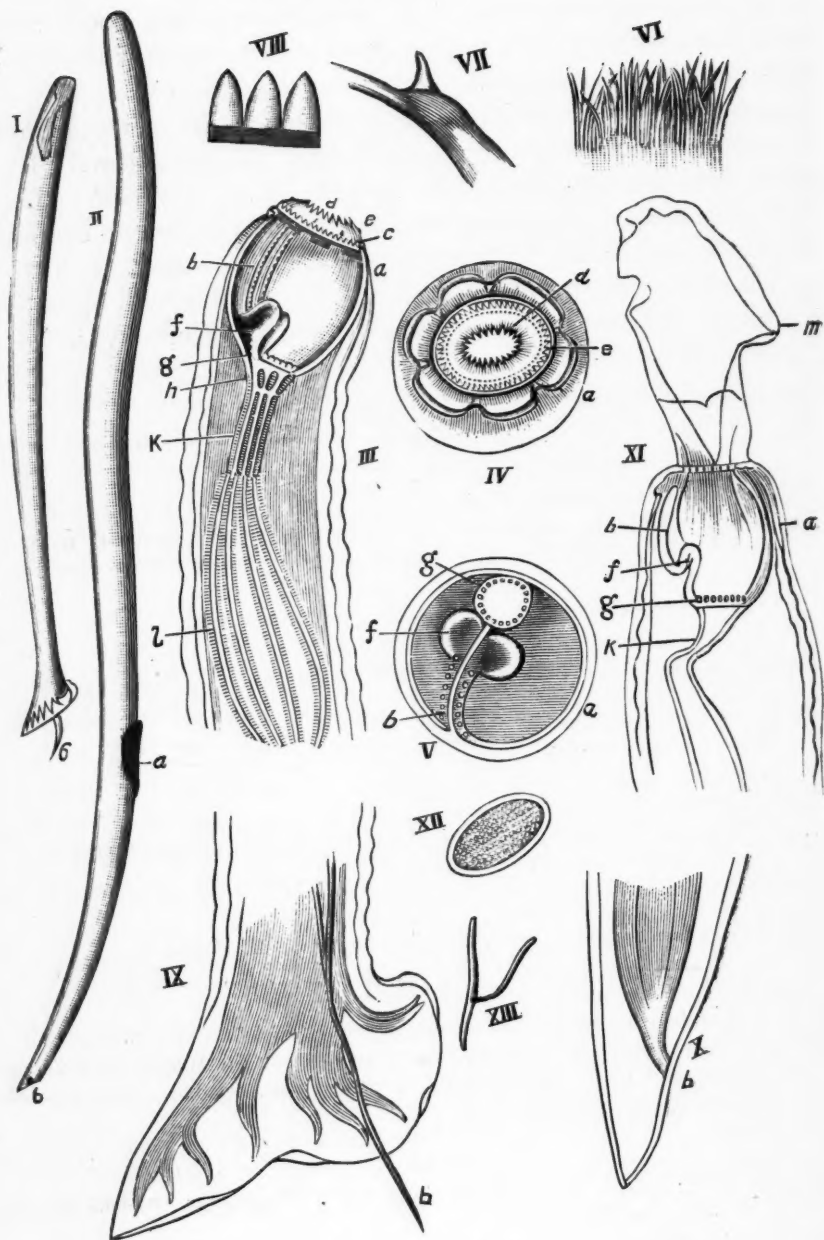
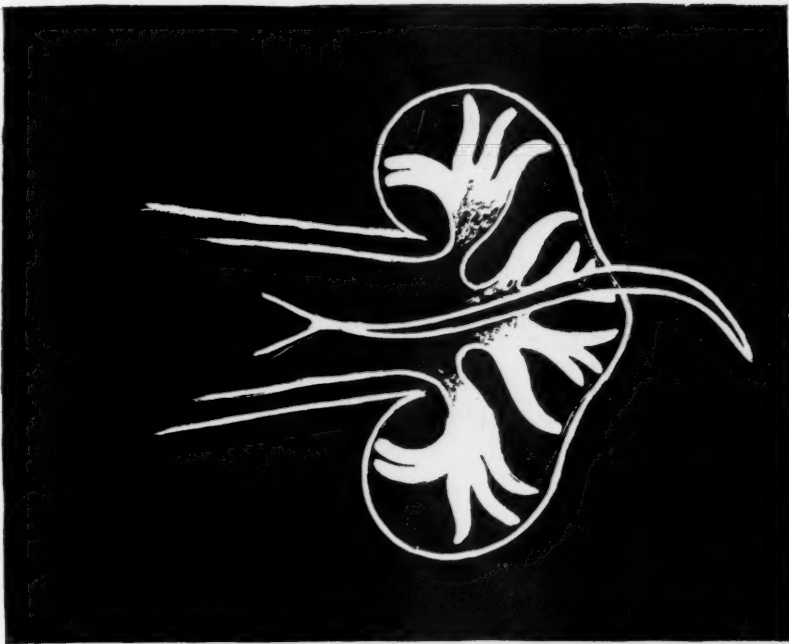
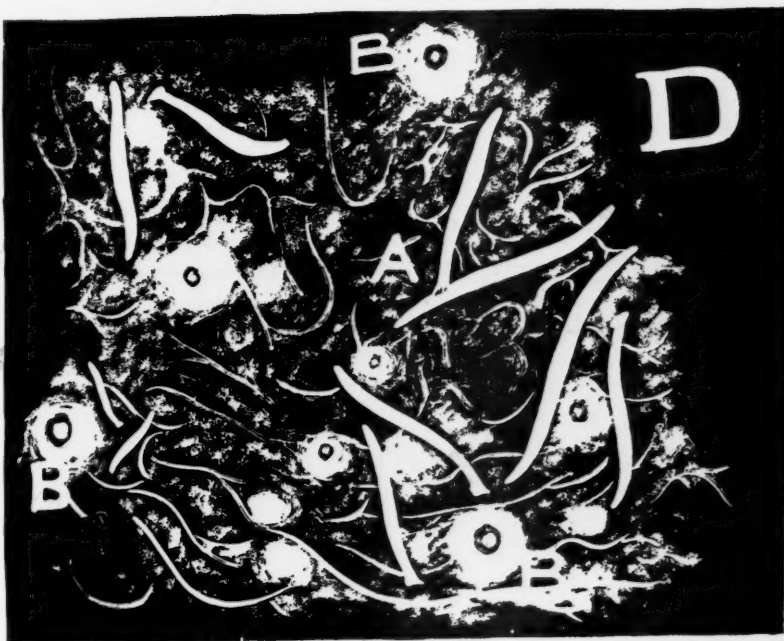


PLATE II.

*Fig. I.*

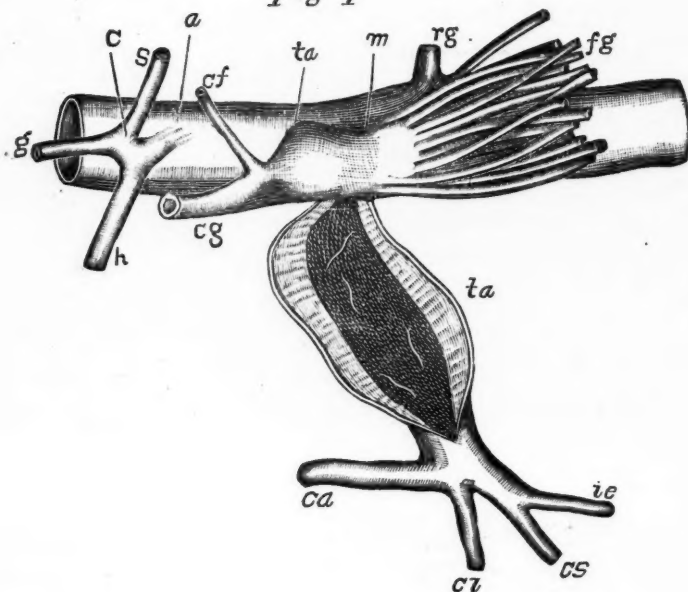


*Fig. II.*

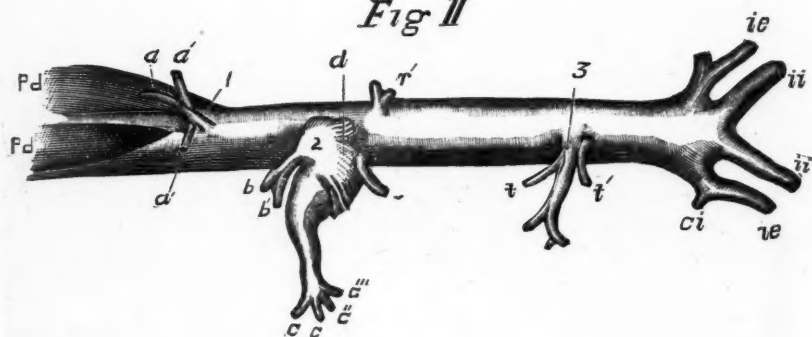


# PLATE III.

## Fig I



## Fig II



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**PATHOLOGICAL ANATOMY.**

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**HISTOLOGICAL STUDY OF THE EXPERIMENTAL AND SPONTANEOUS TUBERCULOSIS OF THE LIVER.**

BY PILLIET.

Aviar tuberculosis gives rise to lesions liable to considerable variations. In the rabbit one may observe either an absence of extensive lesions (that is, massive) or the formation of giant intra-vascular, surrounded with embryonic cells (Yersin type), or again, the formation of giant cells of transitory duration, which become the origin of an acute tubercular cirrhosis. In the guinea pig, the last form is most predominant. In birds (in spontaneous cases), the lesions vary, amyloid transformation being more frequent in some, while absent in others.

Experimental human tuberculosis gives rise, in the guinea-pig and the dog, to generative lesions (even of coagulation), which may resemble caseous tuberculosis, and to inflammatory lesions of an interstitial hepatitis, which obliterates the capillaries, and stimulates, secondarily, the atrophy of the habenule with its sequelæ. In the acute forms, no properly so-called tuberculosis is found in the liver. One may find in that organ in man, nodular lesions, not encysted, lymphoid in their nature, and often accompanied with hemorrhages, and forming a starting center for cirrhotic lesions. There is no essential difference between these lesions and those which are produced in the guinea-pig. In the monkey, intermediate forms are found.

The existence of this series of intermediate forms between the most marked cases, renders the appreciation of the nature of the inflammatory or degenerative lesions difficult; and it is here that anatomo-pathology must be enlightened by pathogeny.—*Rev. des Sc. Med.*

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**EXPERIMENTAL RESEARCHES IN THE TRANSMISSIBILITY OF THE CANCER.**

BY S. DUPLAY.

The attempts which have been made to transmit cancer from the dog to other animals (rabbits and guinea-pigs), or

from man to animals, have ended in merely giving rise to inflammatory lesions, manifested around the grafted fragments, which have always, however, afterward completely disappeared by resorption. The conditions of this first series of experiments are such that it may be concluded that cancerous neoplasms are not absolutely transmissible from one animal to another of a different species. In respect to the attempts made to effect the transmission of the disease from dog to dog, differently from what might be inferred from facts obtained by others, they have in the hands of the writer been followed only by negative results. But in default of further experiments and more numerous observations, made under more favorable conditions, the author does not desire to be understood as definitively accepting the negative theory.—*Rev. des Sc. Med.*

### PHYSIOLOGY.

#### UPON THE SUPERIOR LARYNGEAL NERVE OF THE HORSE.

BY SIG. EXNER.

Professor Moller had observed in two experiments, that the section of the superior laryngeal nerve in the horse gave rise to a degeneration of the muscles of the larynx on the side operated upon.

S. Exner has also discovered by means of the laryngoscope, that the section of the same nerve in the horse immediately brought on paralysis of the vocal cord on the same side.

These experiments and their results being denied by H. Munk and his students, Breisacher and Gutzloff, Exner renewed his observations on two other horses, and observed, this time, that the section of the laryngeal nerve did not produce the paralysis of the vocal cord.

The most plausible, if not only possible explanation of such contradictory conclusions, reached by equally conscientious and careful observers, must be looked for in the suggestion that the superior laryngeal nerve in the horse, is, by its physiological composition, subject to a considerable degree of individual discrepancy and inconsistency.—*Rev. des Sc. Med.*



## EXTRACTS FROM GERMAN PERIODICALS.

By R. MIDDLETON, R.V.S., Philadelphia, Pa.

## TETANUS AND INFLUENZA.

Schindelka observed four cases of tetanus that had been brought to the Vienna clinic, and which subsequently contracted influenza, under circumstances which led him to suppose that between the micro-organisms of the two diseases there existed a certain antagonism.

The peculiar course of every case emphasizes the obduction that the tetanus bacillus is retarded in its development by that of influenza.

The four instances here recorded developed so little variation, one from the other, that by reiterating one, an idea is secured of the others.

On the fifth of September an old gelding was led to the hospital with the history that the same symptoms then manifested had been present for three days; these consisted of a general tetanoid state of all the muscles.

For want of proper accommodations and space, the patient was put in a box stall, adjacent to two horses at this time affected with influenza. The former could take no solid food necessitating mastication—the trismus being too extensive—but could imbibe any nourishment in the form of a liquid. The contraction of the posterior muscles was not of sufficient intensity to greatly effect the power of locomotion in these limbs.

From the fifth to the eighth day much perspiration exuded; pyrexia absent; respiration varied between twenty and twenty-four; pulse rate indicated forty-eight; temperature ranged from 99.6° to 100.4°. Treatment gave negative results.

On the evening of the ninth day, the picture presented by the animal was an entirely different one. Previously much excited, the patient now stood with drooping head and half closed eyes, but the spasms continued with the same intensity. Temperature 104°; pulse 56. The next day great weakness

overcame the animal; conjunctiva reddened and swollen; loss of appetite; increased thirst; indifferent to surroundings. The cramp of the various muscles had subsided, and the trismus in particular had disappeared. The tongue was perfectly mobile, and moved with the greatest freedom. Power of volition over the whole body seemed to be reinstated.

From the eleventh to the fifteenth day the amount of pyrexia remained over  $104^{\circ}$  and sank to  $102^{\circ}$ ; pulse declined from 60 to 48. On the fourteenth day the debility was of so widespread a nature and intensity, as to indicate the administration of excitants. Recovery is recorded from the sixteenth day on. On the twentieth day patient free of fever, and on the thirty-fourth, the same was discharged as cured.

In the other three cases the cause of the disease could be traced to wounds upon the animal. In these also could diminution and ultimate disappearance of the tetanus be recorded immediately upon the rise of temperature, *i. e.* contraction of influenza.

In every case the horse had suffered from tetanus more than a week—nine to seventeen days—before experiencing influenza.

In experiments, at a later period, undertaken to confirm the above, in which cultures of influenza were used, these most interesting results could not be confirmed. In not one instance did Schindelka succeed in annihilating tetanus through injection of pure influenza cultures. It is, nevertheless, with more than passing notice that we read the account of this occurrence at the Vienna university.—*Österreich. Ztschr. f. Wis.*

#### RETRO-PHARYNGEAL HEMORRHAGE IN A COW.

A cow that was the second time pregnant, exhibited tumefaction of the left sub-aural region.

The animal was in medium good flesh, was well nourished, and gave much milk. On the inferior border of the parotid gland, and displacing the larynx, a well demarcated swelling, which approached in size a child's head. A few centimeters posterior to the angle of the left inferior maxillary, a fluc-

tuating surface about the extent of a quarter dollar; all other portions of the formation were warm, hard and painful. General condition healthy.

J. diagnosed an abscess, but did not venture a solution of its origin. Puncture of the aforesaid soft spot of the tumor liberated about one pint of a healthy, yellow, odorless pus.

After the incision, I changed his diagnosis to a suppurative hæmatoma. The wound readily healed with the diminishing in size of the formation; later the general health was affected. As this swelling receded, there appeared upon the inner surface of the left inferior maxillary branch, a hard oblong tumor extending upward and inward, displacing the larynx and pharynx. Also in the parotid region could a swelling be determined, directly superior to the larynx, which interfered appreciably with respiration. The nature of these swellings could not be determined.

The animal became debilitated and continued to emaciate; difficult deglutition associated itself with the dyspnoea, the formation increased in circumference, until finally a tracheotomy was done as a last resort.

Two days later the patient expired; a great quantity of blood escaped from the nose, and later occluded the nasal openings as a coagulated mass.

The post-mortem exposed thickening of the pharyngeal mucous membrane, with hypertrophy of the sub-mucosa, in which numerous vessels had developed and rendered soft. Adjacent to the swelling on the submaxillary bone, the connective tissue sensibly thicker. The cavity of the first abscess had been entirely effaced. Head of the trachea and œsophagus to right of the median line and surrounded by abundant tissue. Above the latter on the left side, and between the posterior nares, a large blood coagulum, surrounded by a thin coating, which included some of the styloid bones. Each surrounding wall of the tumor was connected with the inflamed periosteum of the inferior maxilla. The left styloid bone, thickened by ostitis and a periostitis, was included in the above clot. The right styloid bone, and right branch of the jaw were normal. The coagulum was softer

upon the right side, and continuous through the posterior nares forward to the exterior.

Nowhere could a degenerated or ruptured vessel be discovered; all the evidence pointed to an extravasation or to a parenchymatous hemorrhage.

J. is of the opinion that several hemorrhages had occurred in the tissues of this locality, one of which had formed the suppurative collection at first mentioned, the others becoming organized masses, which included the adjacent bones in the inflammatory process. These numerous collections would very naturally produce narrowing in the caliber of the pharynx, causing difficulty in deglutition and in respiration.—*Deutsche Ztschr. f. Thiermed. Bd. xii. H. 4, 5.*

#### INTRAVENOUS TRANSFUSION OF ZIEMSEN.

This method of subcutaneous injection of blood, which several years ago attracted much attention, and which had been greatly esteemed, has been much improved. The old method consists of removing the blood directly from the vein by means of a canula needle attached to the same syringe which is used to introduce the blood into the connective tissue beneath the mucosa. During the propelling of the blood into the latter tissue, the region is kneaded or exercised by means of the fingers for a quarter hour, thereby dispersing the fluid and avoiding the formation of thrombi. By this means large quantities of blood may be incorporated with the cellular tissue, without the appearance of the smallest coagulum.

Though this manner of blood transfusion is made valuable because it is so technically simple, so effective and so unaccompanied by danger, yet Ziemsen's opinion is that it will not entirely supplant the intravenous injection. Its effects are, moreover, not felt so instantaneously as the latter, and from the pressure applied in diffusing the blood, it must need be that cells are destroyed in the process.

Ziemsen, however, has ingeniously united the prominent qualities of each method, and excluded those objectionable

features which made the intravenous and his old method undesirable. His principle is to use a hollow needle in removing the blood, and a second needle to inject the same directly into the vein of the recipient. The fundamental element of success in the application of this procedure is an aseptic condition of the instruments, skin of the patient and hands of the operator. Narcosis is necessary in order that the vein may be exposed and the needle introduced without permitting, contemporaneously, the admission of air.—*Munch. med. Woch.*

#### HEALING OF FISTULA BY OLEUM TEREBINTHINÆ.

Most veterinarians appreciate with what great difficulty the healing of fistulous tracts is accomplished, in many instances, especially when occurring in places that are distant from one's office. In the following sketch we desire to advance a new method of procedure that has proved itself very acceptable by the rapidity and certainty of its operation.

The history, as related by the owner, is to the effect that for several months a cow had shown upon the left hind thigh, in the region of the coxo-femoral articulation, a large swelling, that he had permitted a butcher to incise, four weeks previous to sending for me. Despite the fact that a large quantity of offensive pus escaped, the enlargement did not diminish, and the opening remained patent. The cow ate but little; gave little or no milk; became thinner from day to day, and manifested great pain in the limb affected, being all but unable to rise when down. Since the patient was one of the most valuable of the owner's animals, he insisted upon immediate action.

We examined an emaciated, six-year-old cow, lying in the stall; by urging, she slowly and with the emission of sundry noises, stood upon her feet. The region adjacent to the hip articulation was much swollen, hard and painful upon pressure. About the width of a hand, anterior to and somewhat below the ischial angle, there existed an aperture into which we could insert a finger several centimeters deep, and from which there exuded minute quantities of a fetid pus, and



ichorous discharge at every movement of the articulation. By means of a probe, a mass of uncovered bone was met fifteen centimeters below the cutis. We communicated our opinion as unfavorable to a rapid recovery, but the owner insisted upon something being done, declining to slaughter the animal. We therefore thoroughly cleansed the canal—owner refusing to permit an enlargement of same—ordering a four per cent. creolin solution injected three times a day. After eight days of this therapy no benefit could be noted, and liquor villati was substituted, being applied throughout fourteen days with likewise no result. The condition at the termination of the treatment was precisely as at the beginning, with the one exception that the appetite had fallen off. Burrow's solution and watery dilutions of an iodine tincture were each used fourteen days with negative results.

All reputable measures having failed, we tried to persuade our client to permit an incision and scraping of the tract, but he steadily maintained that there must be some agent applicable to such a wound that would close it. As a last resort we determined to use *ol. terebinth. Americana* as an injection, but with little faith in its efficacy. A few days after our last conversation, about the middle of December, we visited the case, and introducing a glass syringe as deep as possible in the canal, emptied its contents, f3 ijss, therein. After the expiration of the fourth day, we again called upon the patient and repeated the dose, after which the cow was uneasy. The owner received instructions to inject the same quantity four days later. About the tenth of January, being in the neighborhood of the village, and curious to know the result of the medicine, the farmer not having written to me since my last visit, we approached the house of our client, who met us with a beaming countenance, and imparted the course of convalescence in great delight. The appetite was now robust, and the agility displayed in regaining her feet when down, was evidence that the excruciating pain had vanished with the other symptoms.

The second case of chronic fistula was in a horse suffering from "poll evil." This had been running six months; the

patient was so weak and thin at the time we took charge of the case that it could no longer be used for commercial purposes. At the commencement, the canal opening was increased in size, and the following preparations were used in the order named, but without producing a satisfactory termination: Creolin solution, liquor villati, Burow's solution. Since the oleum terebinthinæ had proven so well in the first case, we concluded to apply it here also. Suffice it to say that in a few weeks the tract and discharges had vanished.—*Berl. Thier. W.*

#### THERAPEUTIC NOTICES.

Several veterinarians have used naphthalin—colloquially tar camphor—in the powdered form with good results in those cases where a bandage cannot be applied. Healthy and rapid granulations are herewith induced. It is much better than creolin for this purpose, and very materially cheaper than idoform. Karl, of Monheim, used the powder and flour together in equal parts. He used this in wounds of the vagina, after first irrigating with a creolin solution; he remarks the healing to have been more rapid with the application of this agent than without it. Karl also applied this mixture, kneaded into a dough, as a suppository in the obliteration of fistulous tracts.—*Woch. fur Thierhkl., No. 18.*

Camphor-phenol in otitis externa is urged by Amick as an anodyne, and for its efficacy as an antiphlogistic application.

℞ Camphoræ  $\frac{3}{4}$  iii,  
Ac. carbol.  $\frac{3}{4}$  i,  
Spir. vini  $\frac{3}{4}$  i.

Sig.—Externally to the diseased parts.

Petroleum as an anthelmintic, says Perrin, is useful when administered either as a drench or as a clyster, in destroying oxyuris vermic and tænia. The drench consists of an emulsion made of one part petroleum to one hundred and twenty-five parts of water, with an equal quantity of ol. linum.

The rectum is previously emptied, and the treatment made several days successively, finally ending with a purge. Good results reported.

Esteveus recommends resorcin, in a one to eight solution as a cure for fevers. Though in his patients the disease had extended to an astonishing extent, he was successful in ultimately curing every case by this method of treatment. The old incrustations are first removed, the patch washed with tar soap, and then either in a solution of creolin or corrosive sublimate.—*Deutsch. Med. Wochenschr.*

Revillet writes the following prescription for the use of creosote as a clyster.

℞ Creosoti, 3 ssi,  
Ol. Amyg.  
Dulc. 3vi,  
Vitel.  
Ovi.  
Unius oq.  
Destill, 3 vii.  
{ M.—Et. f. Emulsio.  
{ Sig.—Give at one injection.

The cresote is by this method rapidly absorbed and well born. It is easily possible by this means to administer one drachm of creosote. Revillet gave every patient from seventeen to twenty ounces within five months.—*Therap. Monatsch.*, 4, 92.

## REVIEW.

DR. P. WILLACH. (Ueber die Natur der Coccidien. Arch. f. w. u. pr. Thierheilkunde. 3 und 4, 1892).

Dr. Willach favors us with a rather novel theory in regard to the nature of coccidia. He claims to have demonstrated by experiment that *Coccidium oviforme*, found in the liver of rabbits, etc., is not a protozoa but simply the egg of a nematode. This egg (??), upon being expelled from the body of the rabbit, develops into a new nematode which Willach names *Pelodera oxyuridis*, which, in turn, upon entering rabbits gives rise to *Oxyuris ambigua*, the eggs of which represent *C. oviforme*.

There can be no doubt that nematode eggs can easily be

mistaken for coccidia, and in fact have been mistaken for them. Leucocytes have also been described as coccidia by at least one author. But the statement that true coccidia are nematode eggs instead of protozoa is one which we could ignore entirely were it not that this interesting and wonderful statement comes from one of the most scientific veterinary journals published.

The secret of Willach's strange results is either that his cultures were not pure, but really contained some eggs of nematodes, or that he really mistook eggs for coccidia. We frequently find nematode eggs in the livers of rats and other animals at Washington, but a careful examination always enables us to demonstrate their egg nature. Willach compares the division of the coccidia into sporoblasts directly with the segmentation of ova; there is undoubtedly a slight resemblance between the two procedures, but from this point on the development of eggs and coccidia have no resemblance to each other, for the sporoblasts of the coccidia give rise to spores, and these in turn to sporozoites. Willach would find it very difficult to give a homology between these later stages of coccidia and the further development of eggs. He has not attempted to explain how forms like\* *C. bigeminum* of dogs, or *C. cruciatum* of fish, can be compared with ova.

The morphology and development of the coccidia has been established so well by zoologists that we need not discuss Willach's views further.—C. W. S.

*Railliet et Moussu.* Filaire des bœtons hémorragique observée chez l'âne (Compt. rend. d. l. Soc. d. Biol. Juin 19, 1892, 6 pp.)

Authors found that *Filaria hæmorrhagica* which causes a cutaneous disease, known as blood-sweating, in the horse, is found also in the ass (*Equus asinus*). The parasite inhabits the subcutaneous and intermuscular connective tissue. The male parasite, which had not heretofore been observed, was found

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\* Several recent authors, including myself, have given Rivolta's synonym for this species, as *Cytospermium villosum intestinalis canis*. I take this occasion to correct this to *Cytospermium villorum intestinalium canis*, which is the name used by Rivolta in 1878.

in the same tissue with the female. Embryos cannot withstand the slightest dessication.—(C. W. S.)

*Railliet.* Recherches sur la transmissibilité de la gale du chat et du lapin due au *Sarcoptes minor*, Fürst.

Railliet was unable to transplant this parasite from rabbit to rabbit, or from rabbits to cats, rats or dogs; the transmission from cat to cat was very easy, but from cat to rabbit it was more difficult; when rabbits had themselves contracted the parasites from cats they could transmit them to other rabbits.—(C. W. S.)

*Railliet.* Observations sur la résistance vitale des embryons de quelques Nématodes (Compt. rend. d. l. Soc. d. Biol. 1892 p. 703, 704).

Railliet gives a remarkable case of the infection of two dogs with *Uncinaria trigonocephala* and *Trichocephalus depressiusculus*. Eight years ago, he conducted some experiments on the development of these nematodes, and ever since that time every dog which he has placed in the kennel in which those experiments were conducted have become infested with these worms. The kennel has been cleaned very thoroughly a number of times, but the embryos have evidently not been entirely destroyed, for quite recently two more dogs (after eight years has elapsed), have become infected with the same parasites.

This, of course, does not mean that they were infected with embryos which have lived eight years, but the original infection was in 1884, and the dogs used since then have in turn become infected, and then have reinfected the abode.

Railliet recommends sulphuric acid as a disinfectant in such cases.

He further observed the resurrection of embryos of *Strongylus rufescens* which had been dried for sixty-eight days.—(C. W. S.)

*R. Blanchard.* Sur les Oestrides Américains dont la larve vie dans la peau de l'Homme (Ann. d. l. Soc. Entomol. d. France, 1892, pp. 109-154).

Blanchard has brought together a large number of cases of oestrus-larvæ, found under the skin of man; he further figures and describes ten larvæ in his possession which were taken from men. His general conclusions are that four American species of oestrides belonging to the genus *Derma-*

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*tobia* attack man, but all of these are found in animals as well, so that we have no right to speak of the species *Dermatobia* (or *Oestrus*) *hominis*. The four species in question have been described under the names:

1st, Ver macaque=*Dermatobia noxialis*: 2d, Torcel=*D. sp.* (?); 3d, Berne=*D. cyaniventris*; 4, Ver moyocuil=*D. sp.* (?).—(C. W. S.)

## SOCIETY MEETINGS.

### PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

The semi-annual meeting of the Pennsylvania State Veterinary Medical Association was held in the parlors of the Allen House, Allentown, Pa., September 6, 1892, and was called to order by President W. Horace Hoskins at 10.30 A.M.

At roll call the following members responded: Doctors Collins, Diemer, Driebelbis, J. C. Michener, Gladfelter, Hart, Hoskins, Keeler, Keil, Kooker, J. C. Foelker, Pearson, Radley, Thos. B. Rayner, Ridge, Rohn, Schaufler, Smith, Timberman.

Those present as visitors were: Drs. A. R. May, Boiling Springs, Pa.; W. G. Benner, Doylestown, Pa.; S. J. Foelker, Allentown, Pa.; D. Waugh, Pittsburg, Pa.; W. H. Heckenberger, Catasauqua, Pa.; H. P. Eves, Wilmington, Del.; B. F. King, Little Silver, N. J.; V. B. Weaver, Centre Valley, Pa.

The minutes of the preceding meeting were read and on motion adopted.

The new members proposed were: V. B. Weaver (non-graduate), Centre Valley, Pa.; Dr. W. L. Hart, D.V.S. Am. Vet. Col., Philadelphia, Pa.; Dr. Chas. J. Harriek, M.R.C.V. S., McKeesport, Pa.; Dr. Francis S. Allen, D.V.S., Am. Vet. Col., Philadelphia, Pa.; Dr. James C. McNeil, V.M.D., Vet. Dept. Univ. of Pa.; Pittsburg, Pa.; Dr. John Doris, D.V.S., Ohio Vet. Coll., Pittsburg, Pa.; Dr. Geo. C. Blaker, D.V.S., Am. Vet. Coll., Richboro, Pa.; Dr. A. H. Dorney, V.S., Ontario Vet. Coll., Easton, Pa.; Dr. W. G. Benner, V.S., Ontario Vet. Coll., Doylestown, Pa.; Dr. S. J. Foelker, V.S., On-

tario Vet. Coll., Allentown, Pa.; Dr. W. L. Nunan, D.V.S., Am. Vet. Coll., Lansdowne, Pa.; Dr. J. T. H. Ferley, D.V.S., Am. Vet. Coll., Philadelphia, Pa.; Dr. David Martin, McKeesport, Pa.

A recess was then taken until the Board of Censors examined the applications for membership, and also considered some recommendation to dispose of the charge which had previously been preferred against Dr. Gottleib Meyers, from Allegheny, who registered from a veterinary college in Munich, Bavaria, but upon examination it was found that he held a certificate of attendance at an agricultural school, the same not being a veterinary school, nor having the power of conferring the degree. The president also requested the board to devise and recommend some means by which the treasury of the association could be replenished, the surplus having been drained by expenses for printing, postage, etc.

The board thereupon convened. When through with their deliberations reported favorably, recommending all the applications presented but that of Dr. David Martin, who was absent and did not appear before the board. His petition was then laid over until the March meeting.

The board further recommends that Dr. Gottleib Meyer be expelled from the association; that an assessment of \$2 be levied upon each member of the association, in order that the expenses already incurred might be liquidated.

On motion the report of the Board of Trustees was received and their recommendations approved.

The next in order was the secretary's report, which gave a brief summary of the work performed during the past six months. Summarizing the registrations in many of the counties during the past six months, he made an earnest appeal for greater individual work on the part of the members.

The meeting then adjourned for lunch, and reconvening at 2 20 P.M., the president referred feelingly to the death of Dr. J. B. Fretz, and asked for the report of the committee on resolutions relating to the same.

Dr. W. S. Kooker, chairman, reported as follows:

*Resolved*, That in the sudden and unlooked for death of

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our late fellow member, Dr. J. B. Fretz, the Pennsylvania Veterinary Medical Association has lost one who, since the origin of our association, had its interest at heart, and by his counsel, courteous manner, gentlemanly conduct, and many good traits has endeared himself to all; and that we will ever hold his memory dear.

*Resolved*, That these resolutions be spread on the minutes of the association, and a copy be sent to his family.

W. S. KOOKER, V.S.

ZENO S. KEIL, V.S.

J. REIN KEELOR, V.S.

Dr. A. Diemer, member of the Committee on Intelligence and Education, in the absence of the chairman (Dr. Weber), made an earnest appeal for stronger fellowship and greater unity of purpose among the members of the profession.

Dr. W. S. Kooker, chairman of the Committee on Legislation, reported but few violations of the act during the past six months. He advised the prosecution of Dr. R. M. Miller, Carlisle; Marcus Porter, Pittsburg; and that an injunction be asked for against the prothonotary of Allegheny county on the grounds of violating the intent of the act in continuing to register non-graduates. He reported also the case of a non-graduate in Lancaster county, who was appealing for the privilege of registering on the grounds that the act was unconstitutional.

Dr. S. J. J. Harger, chairman of the Committee on Sanitary Science and Police, being absent, had forwarded his report, and the president asked Secretary Ridge to read the same. Report:

The sense of the association was expressed favorably in regard to proposed sanitary laws which are under consideration in Pennsylvania. It was left jointly to committees on Legislation and Sanitary Science and Police, that they should direct the action of our association in regard to these proposed new laws.

Under the head of unfinished business the following amendment to the by-laws was adopted:

That the annual meetings of this association shall be two days, in order to more thoroughly complete our work.

Under new business, the following amendments were offered:

1st. That on and after the year 1893, the annual dues of this association shall be two (2) dollars, to be made in semi-annual payments.

2d. Any member in arrears for his initiation fee and dues for a period of two years, shall, after eighteen months, receive two quarterly notices of said arrearages, and, on failure to liquidate the same, shall be reported to the association by the treasurer for expulsion.

Bills to the amount of \$132.13 were reported, and orders were passed for payment of same.

Papers being in order, Dr. Leonard Pearson gave a very complete summary of the views of all the leading investigators on the subject of "tuberculosis" in cattle, and particularly referring to the value of "tuberculin" as a diagnostic agent. He reported many favorable and interesting results in his own experience.

Dr. Jas. A. Waugh being absent, he had sent his brother, Mr. D. Waugh, to demonstrate his method of castrating cryptorchids. In the absence of an animal to operate upon, he exhibited his double side line and his way of securing them for operating. His plan was to pass up behind the inguinal canal to the point where he found the testicle engaged in its passage to the scrotum, and cutting or breaking down upon it, removing it with the ecraseur. In answer to an inquiry, he said that in over one hundred cases operated upon, he had failed to find a single case where the testicle was intra-abdominal.

Dr. J. F. Butterfield being absent, had forwarded his report on a case of intussusception. His report was read by Secretary Ridge.

The following delegates were appointed to the United States Veterinary Medical Association meeting at Boston on the 20th inst.: Drs. J. C. Foelker, J. Curtis Michener and John R. Hart. Dr. Michener declining, Dr. Geo. B. Rayner was appointed to fill the vacancy.

To the Veterinary Medical Association of New Jersey,

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Drs. W. S. Kooker, W. H. Ridge and Leonard Pearson were appointed for the next six months.

After which the meeting adjourned.

ROBT. GLADFELTER, *Rec. Sec.*

W. H. RIDGE, *Corres. Sec.*

W. HORACE HOSKINS, *President.*

#### NEW JERSEY VETERINARY MEDICAL ASSOCIATION.

The Veterinary Medical Association of New Jersey held its twenty-sixth regular meeting on Thursday, August 11th, 1892, at Saenger Hall, Belmont Avenue, Newark, N. J.

Meeting was called to order at 11 A.M. by the President, Dr. J. C. Dustan, of Morristown, N. J. Minutes read and approved

The Secretary called the roll, and the following members responded: Drs. J. C. Dustan, Morristown; J. W. Hawk, Newark; W. B. E. Miller, Camden; J. C. Higgins, New Brunswick; B. F. King, Little Silver; S. Lockwood, Woodbridge; H. W. Roland, Newark; W. Runge, Newark; R. O. Hasbrouck, Passaic; B. L. Drummond, Woodbridge; W. H. Cooper, Jersey City; J. Gerth, Jr., Newark; M. M. Stage, Dover; J. M. Everett, Hackettstown; A. W. Axford, Naughton; H. Exton, Washington; S. W. Shuppan, Jersey City; H. W. Eliot, Newark, and a number of visitors.

Applications for membership: Dr. J. N. Wittpenn, Jersey City, N. J., graduate of the American Veterinary College; Dr. O. C. Eisenhart, Asbury, N. J., graduate Ontario Veterinary College; Dr. Frank Lippincott, Swedesboro, N. J., non-graduate; Dr. W. Horace Hoskins, Philadelphia, Pa.; John O. Pitney, Newark, N. J.

Dr. Miller made report of the Board of Censors, and recommended the names of Dr. J. N. Wittpenn and Dr. O. C. Eisenhart for active members, and Dr. F. Lippincott's application be returned; also recommended Dr. W. H. Hoskins and John O. Pitney as honorary members. Report accepted.

#### SPECIAL MEETING HELD IN NEWARK.

Report of Committee on Legislation.

Report of Committee on Registrations.



List of prosecutions in Camden, N. J., reported.

Election of members: Dr. J. N. Wittpenn and Dr. O. C. Eisenhart elected active members. Dr. W. H. Hoskins and John O. Pitney, the counsellor of the Association, as honorary members.

Dr. S. W. Shuppan, one of the essayists, read a paper on "Is Pneumonia Contagious."

Cases were reported by the following: Drs. Miller, of Camden; Gerth, of Newark; Hawk, of Newark; Shuppan, of Norwalk, Conn.; Runge, of Newark; Higgins, of New Brunswick; King, of Little Silver.

The following members were dropped for non-payment of dues: Drs. Otto Von Lang, Salem, N. J.; C. Lawienz, Newark, N. J.; Robert Leis, Newark, N. J.; R. T. Churchill, Secaucus, N. J.; R. Stanwood, Freehold, N. J.; A. Maurice, Moorestown, N. J.

After reports of committees, meeting adjourned for dinner.

Meeting was resumed at 4 P.M., and after transacting some miscellaneous business, adjourned at 7 P.M. to meet on Thursday, Dec. 8th, 1892, at New Brunswick, N. J.

W. H. COOPER, *Sec'y.*

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## OBITUARY.

J. L. KIDD, D.V.S.

We regret to announce the death of this worthy member of our profession, which occurred a few days ago in Lexington, Ky. Dr. Kidd graduated at the American Veterinary College in 1887.

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